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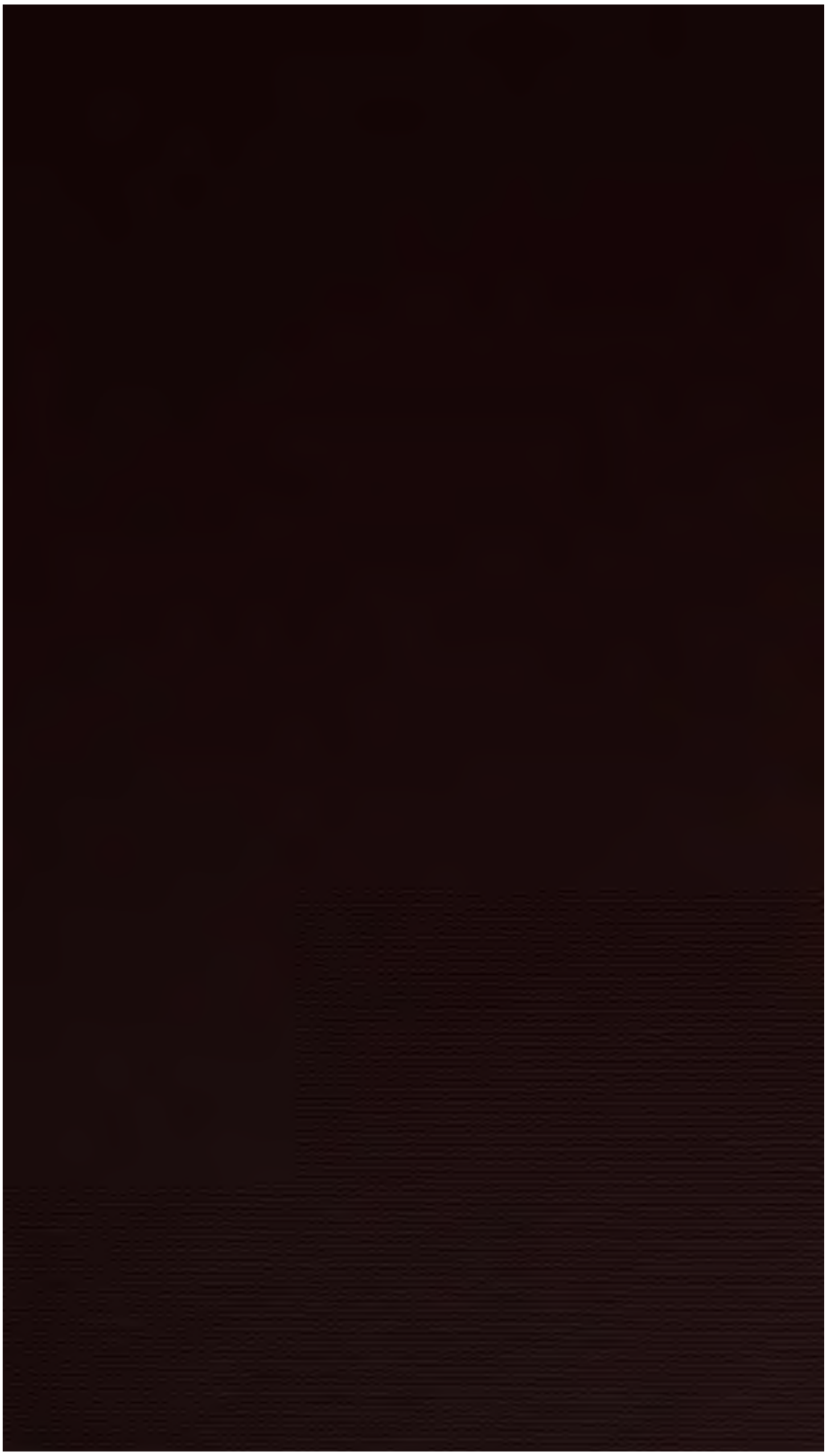

LIBRARY OF CONGRESS THE

GOLD DROP.

Infantado Ram; bred and owned by Edwin Hammond, of Middlebury, Vt. Three years old.

38TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { Ex. Doc. No. 91.

REPORT

OF THE

U. S. Dept.

COMMISSIONER OF AGRICULTURE

FOR

THE YEAR 1863.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1863.

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IN THE HOUSE OF REPRESENTATIVES, *June* 4, 1864.

On motion of Mr. Clark, from the Committee on Printing,

Resolved, That there be printed by the Superintendent of Public Printing one hundred and fifty thousand extra copies of the Annual Report, for 1863, of the Commissioner of Agriculture, with the accompanying documents, for the use of the present House; and ten thousand extra copies for distribution by that department, with the engravings interspersed through the volume in their appropriate places, and that five hundred of these shall be printed for the use of said department on 56-pound paper.

Dept
John Lee Ball, Jr.
Sept. 15, 1962

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Copy

REPORT

OF

THE COMMISSIONER OF AGRICULTURE.

DEPARTMENT OF AGRICULTURE,
Washington, D. C., January 1, 1864.

SIR: I have the honor to submit my second Annual Report. Although the year just closed has been a year of war on the part of the republic over a wider field and on a grander scale than any recorded in history, yet, strange as it may appear, the great interests of agriculture have not materially suffered in the loyal States. With the exception of some fruitless incursions along the border, and the invasion of Pennsylvania and defeat of the insurgents on the now historic field of Gettysburg, the loyal people have everywhere enjoyed a "broad and quiet land," with abundant health and prosperity, while a wider territory has been cultivated and a larger yield realized, except where drought and frost interfered, than during any previous year. Notwithstanding there have been over one million men employed in the army and navy, withdrawn chiefly from the producing classes, and liberally fed, clothed, and paid by the government, yet the yield of the great staples of agriculture for 1863, as compared with the previous year, has been as follows, viz:

	1862.	1863.
Wheat, in bushels	169,993,500	191,068,239
Oats....do	172,520,997	174,858,167
Corn....do	586,704,474	449,163,894
Hay, in tons	20,000,000	18,500,000
Tobacco, in pounds	208,807,078	258,462,412
Wool.....do	63,524,172	79,405,215

T c parison, with the exception of corn and hay injured by drought fr even more favorable for 1863, if instituted in regard to the general ts of the farm. This wonderful fact of history—a young republic, car- r war on its own territory and coasts, and at the same time feed ; i lf and foreign nations, but furnishing vast quantities of

raw materials for commerce and manufactures—proves that we are essentially an agricultural people—that three years of war have not, as yet, seriously disturbed, but rather increased industrial pursuits, and that the withdrawal of agricultural labor and the loss of life by disease and battle have been more than compensated by machinery and maturing youth at home, and by increased influx of immigration from abroad. In spite of the vast influence of the enemies of free institutions in Europe, brought to bear on the minds of her people against our republic, notwithstanding the flame of civil war still rages within our borders, yet the tide of immigration was never stronger, healthier, or more promising. While some as adventurers seek this western world for military fame, stimulated by our large bounties and the chances of promotion, or to fight, sincerely, the battles of freedom and equality, the greater part come to labor, to enjoy independence and quiet, and to make happy though humble homes for themselves and their children.

According to the report of the New York Commissioners of Immigration, the number of immigrants arriving at that port during the eleven months ending November 30, of the year 1863, was 146,519, against 76,306 during 1862. This proportional increase holds good in respect to the other great ports of our country, independent of the large number of persons from Canada and other portions of America. To an intelligent mind, and especially to every American, the causes of this increasing influx of foreign population, even during a period of war, are very evident and gratifying. I shall simply indicate some of these causes, without discussing them at length.

In the first place the present rebellion is being understood abroad in its true light—as a revolt against democratic institutions, the rights of labor and human nature, and that the triumph of the government guarantees to immigration its great rewards of peace, prosperity, and freedom.

In the second place none but actual citizens, or those who have legally declared their intention of becoming such, are liable to military service; while at the same time such aliens enjoy nearly all the advantages of citizenship. However manifestly unjust this immunity is to those who defend and support the state, yet it stands forth as a noble proof of the generosity of the republic towards all who, in foreign lands, oppressed and poor, desire to better their condition.

Again, the political, religious, and social institutions of the United States, such as the elective franchise; freedom of speech, of the press, and of worship; the separation of church and state; the tenure of the soil and of other property; the honorable condition and remuneration of labor; the cheapness of education, of food, and raiment; the equality of all citizens in the courts, and the open and fair field in the race of public and private life; all these, and more, are justly attractive to the masses in Europe when properly explained and understood. And no better service could be rendered the government and the great cause of agriculture than the preparation and dissemination of correct knowledge throughout Europe respecting the United States as the country of immigration.

A fourth , attracting at this present time so many honest sons of toil
is and workshops of Europe to America, is the demand for gen-
abor ly agricultural, owing to the vast number of our citizens now
y navy, or who have perished in the defence of their country.
y, as the more general and positive cause of all, may be stated the
nd fertility of some lands, and the cheapness and capability of
s, in connexion with the provisions of the homestead act, by which
offers, gratis, to each actual settler one hundred and sixty acres
be ppropriated land. Besides this free grant, the government offers
of land at $1 25 per acre, while improved or exhausted farms, in
of our country, may be purchased on the most favorable terms. In
exion there are several topics worthy of most serious consideration,
which I desire briefly to call attention.

W ever, owing to the war and the march of events, may be the future
of land and labor in the rebellious States, or the legal decisions of
, arising out of confiscation, litigation, or the demands of the military
ice, yet a great change must gradually take place, not only in the tenure
l and its modes of culture, but in the people themselves and their
. Much of the land will gradually pass out of the hands of its
t proprietors, either by purchase, the decision of the courts, or by the
force of circumstances. Many estates will be divided into smaller farms and
d by the humbler classes in the south, whites and freedmen, and by
us and enterprising settlers from the other States and from Europe.
ld fallacy, so long inculcated by politicians and accepted by the people
ny other fallacies respecting the south, that none but negroes can toil
, will be thoroughly exploded during the present generation. Once divide
the vast estates and elevate labor to its true dignity, by hiring instead
owning it, and I venture the prediction that in less than ten years after the
the war, over a million of the industrial classes, native and foreign, will
e settled in the sunny south, making it teem with new beauty, progress, and
w h. The tides of immigration which now flow across the sea, and sweep
west l northwestward with such irresistible power, bearing and leaving in
co se the rich deposits of industry and art, of prosperity and life, will
divide at the Alleghanies and equally enrich the hills, the valleys, and
of south.

T g rs governing the flow of population are as palpable as those
t ysical world; and these laws should be studied and heeded
s if they desire to populate and develop equally every part
t r. Men who have been oppressed in the Old World, and have yet
d igh left to seek a free life in the New, will not settle in the mild
of the south, where labor is legally degraded, but go, though it be to
and winter snows of the northwest, where labor is honorable in all.
respect to the south, with its magnificent zones of climate and natu-
soil, there is no question but that her agricultural products and
will be vastly increased by the new condition of things im-

posed upon her by the rebellion. Terrible as is the ordeal, time, moderation, freedom, and industry will be the great healers and rectifiers; so that it shall be seen that even war offers its compensations as well as peace. Plantations that now contain from three to five thousand acres of land will be divided into farms of from three to five hundred acres, which can be more easily and better tilled, and made far more productive. While the south will continue to grow the great staples, such as cotton, sugar, and rice, many other semi-tropical productions may be introduced, of equal value and more easily cultivated, together with all the cereals, grasses, fruits, and vegetables of the temperate zone.

The half has not been told or tested in regard to the capabilities of the southern States. In times past, all their available capital, skill, and labor having been devoted to the cultivation of the great staples, no special attention was given to other crops of equal value, more developing to the country and more conducive to the comfort of the people. With smaller farms and intelligent and interested labor, the following, among other articles, might be introduced and successfully cultivated in the south: the tea and coffee plants; the opium poppy, the vanilla, ginger, castor bean, assafœtida, wax and quassia plants, silk cocoons, gum arabic, mastic and camphor trees, the Chinese yam, the sweet chestnuts, the earth and other almonds of southern Europe, the Persian walnut, the cork and gall-nut oak, the arrow, licorice, and orris roots, various valuable hemps and grasses, the prune, fig, date, pomegranate, olive, tamarind, guava, nectarine, shaddock, pineapple, and pistache, Iceland moss, the cochineal, indigo, dyer's madder, frankincense, balsam, Egyptian senna, and various other productions which we now purchase abroad at an annual expense of many millions of dollars.

The articles above enumerated form but a small portion of the possible productions of the south; while she is known to be capable of yielding not only the great staples of commerce and manufactures, but an abundance of almost every kind of food if sufficient attention was paid to its cultivation. It is a notorious fact that in the palmiest days of the south, except on the tables of the wealthier classes, the diet of the great body of the people, in variety of meats, vegetables, and fruits, was generally poor and often produced elsewhere, simply because tillage was otherwise directed or totally neglected.

Although discussion on the subject of the exhausted and abandoned lands of the south and the best modes of reclaiming them would be, just now, a most valuable contribution to the agricultural needs and changing condition of the country, yet I have not, at present, the data necessary for such an undertaking. Let me call attention, therefore, more especially to Virginia, one of the greatest but most neglected agricultural States of the Union.

Virginia contains 39,265,280 acres of territory, only 11,435,954 of which are under cultivation of one sort or another, the remainder being wild, worthless, or abandoned land. In 1860 the total population of the State was 1,596,318, 490,865 being slaves, who were owned by some 55,000 masters. At that time the actual number of whites over fifteen years of age engaged in agriculture was only 108,304. The rebellion has materially altered these figures, and com-

pletely ruined whatever of prosperity slavery had not yet destroyed. Nature, however, has done everything for the "Old Dominion," and time and free institutions will yet vindicate her ancient generosity, abused and tempted though she has been to the very verge of exhaustion by a false and shiftless husbandry.

Among the productions of Virginia, as enumerated in the last census, were wheat, corn, rye, oats, tobacco, cotton, rice, wool, pulse, sweet and other potatoes, barley, hops, flax, hemp, silk cocoons, maple, cane and sorghum molasses, honey, buckwheat, hay, butter, cheese, clover and grass seeds; the various fruits and vegetables of the temperate zone; superior cattle, sheep, horses, and mules, besides a wealth of game and shell-fish on all the tide-waters of the State. Besides these, Virginia is capable, according to the laws of the isothermal zones of climate, of producing a much wider range of products. She is extremely well watered, affording an abundance of moisture to the soil, while her water-power is not surpassed by any State. Her sea-coasts, bays, and navigable streams afford easy access to the best markets, while her great estuary offers sites for cities, whose commerce, fed by free institutions, might rival the chief marts of the country.

The mineral wealth of Virginia is equal to that of almost any other State, but it has not been greatly developed. Besides gold, there are numerous and vast beds of iron, copper, and lead ore; the hematite iron ore of the valley of Virginia especially yielding a very superior metal. Other portions of the State possess vast deposits of gypsum, marl, salt, and coal, with oil wells and mineral springs.

The valley of Virginia, elevated in position and watered by the Shenandoah and the affluents of the James, is exceedingly fertile, and, owing to its extensive limestone formations, must ever continue a great wheat-growing region. On the other hand Eastern Virginia is composed wholly of tertiary sands, clay, and marls, the latter deposits being found, of course, along the borders of the Chesapeake and Atlantic. Some of the strata of Eastern Virginia abound in fossil shells, and little altered in appearance from those of living beds along the coast, and furnish most valuable material for fertilizing the worn-out lands.

T soil of the tide-water region is a light sandy loam, capable, with proper are, of yielding well; but at present it is about exhausted under the vicious s m of tillage practiced there for several generations. All the worn-out s of Virginia can be easily brought up to their former fertility by plough- a little deeper and by the application of lime to correct the acidity of the soil. Lime decomposes the organic matter in the soil and frees the carbonic It acts, also, upon the silicates and earthy salts, decomposing them llowing such combinations as the plants require. The free use of gypsum rl, also abundant in various parts of the State, would soon redeem usted land.

t dwelli upon the general agricultural advantages of Virginia, I ion to one or two special points. The soil and climate of

the State are finely adapted to the cultivation of grasses and the raising stock, especially sheep. It was stated by the late Peter A. Brown, who in his cabinet specimens of wool from all parts of the world, that the wo from Virginia had more life and better working qualities than any other th had ever come under his microscopic examination. Owing to climate, dive of surface, and the abundance of iron in the soil, Virginia is well adap all kinds of fruit, especially grapes, which are rapidly becoming one of great crops of the country.

At the close of the present unnatural and causeless war, Virginia, v soil has been so often pressed by hostile armies and moistened by the b blood of the republic, will begin a new and better life. Centrally situat with water-sheds looking eastward and westward over a vast empire of fi and hopeful men, blessed with a salubrious climate and so many and such natural advantages, she will be settled, at an early day, by a vigorous a progressive people. These general observations will equally apply to seve of the other southern States.

Without dwelling further on general topics, I desire to call attention to *labors* and expenditures of the Department of Agriculture during the p year; to what it proposes to accomplish during the coming year, and to increased appropriation necessary to enable it thoroughly to fulfil its missi

A belief in the importance of agricultural statistics had been gaining stren in the minds of our thinking men for a long time. But the events of the l two years, and the present condition of the United States, in themselves, s relatively to other nations, has wrought a thorough conviction that an absol necessity existed in our country, so essentially agricultural, upon which ot nations are so largely dependent for food supplies, and with which the inter of trade and commerce are so closely interwoven, that more reliable informat must be obtained as to the supply, present and prospective, of the vari crops which would be required to meet the demands of home consumption for foreign export. To get the facts from which reliable estimates might made, required my first attention after the organization of the department, gave me no little anxiety.

The joint resolution of Congress, passed March 3, 1863, that "the l of the several departments of government be required to furnish the Supe tendent of Public Printing with copies of the documents usually accompany the annual reports, on or before the first day of November of each year," co not have been intended to apply to this department, whose duties, under organic act, in "the collection of statistics," could not possibly be conclu by that time.

To accomplish this great and very important object has required a amount of time and labor, and, notwithstanding many difficulties, the w thus far has been accomplished to the satisfaction of the farmers of the coun Although very much indebted to full and complete returns of the Cen bureau, yet such were the ex ry changes which had occurred in country since those were tal the diversion of laborers from the farm

s of their country; in the change of so many from producers to co rs; in immigration; in the unusual increase and consumption di ions and diminution of others, that I found other and additional info ion necessary.

A s m of correspondence was attempted with reasonable success. The of t various agricultural societies and farmers' clubs are the pe o furnish, themselves or by others, the desired facts. In many e done this faithfully and earnestly; others having neglected it, g and active farmers and business men of all professions were promptly t deficiencies.

S and clubs should be formed in every part of the country, with l efficient officers, and all such organizations which now exist be officered by such men. The societies and the farmers composing w l then be brought in direct connexion with the department, with l ficial both to themselves and the government.

two thousand circulars, with questions plainly put, and requiring but answers, have been sent monthly to correspondents in every State and every settled county, the replies to which, requiring much labor in compilation and arrangement, have been, with reports on the weather from vers of the Smithsonian Institution, and with other timely suggestions department, published monthly, ten to fifteen thousand in number, ead over every portion of the country.

The cess attending the first attempt of our government to collect the tu statistics of the country is attested by the newspaper press all over commercial and political, as well as agricultural, and is an indication w might be done in a well-arranged plan, provided for by Congress and ied out by governmental aid. There have been issued, in all, about twenty d circulars of inquiry, and sent out about seventy thousand monthly rts.

It y be proper to remark here that my first annual report, embracing a amount of valuable and timely agricultural information and statistics, fur ed by able contributors, has been published and distributed during the for the benefit of farmers generally.

The meteorological reports published by the department have been furnished through the kindness of Professor Henry, of the Smithsonian Institution, taken from the re s of more than a hundred observers, at various points in almost every loyal ate, and have been read with deep interest by the people.

It ed that immense benefits would accrue to the country, if, from tic the condition of the weather could, under the direction of the daily reported by telegraph to this department.

connexi I beg to allude to one of the difficulties in the way against l w ing of the department. Under the postal law of March, nt lebarred from receiving any article, or communication p be prepaid. The 42d section provides that "all cor- di to any executive department, or any officer in it, must now

be prepaid, except official communications written by some officer of the de ment, or an officer under its control or responsible to it." As there is n and cannot be, any such officer "responsible" to this department, I have be obliged, at a considerable expense, to forward to all the "correspondents," to Smithsonian observers, prepaid envelopes, and stamps for their returns.

This, however, I do not regard as the most objectionable feature; but e inquiry or item of information concerning any tree, plant, fruit, or seed, noxious or beneficial insect, any disease attacking plants or animals c cated to this department, although inuring to the benefit of the whole count must be taxed upon the individual who makes the inquiry, sends the inform tion, or forwards the specimens of seeds, plants, or insects, sometimes qu heavily—in some cases so heavily that communication is entirely barred. all information received by this department is the gratuitous, unpaid gift of people, I venture to express the hope that Congress will early so amend law that the farmers of the country may be put in free communication wit department created for their benefit.

The great, imperative, and increasing calls upon the department for seeds all kinds, from all sections of the country, especially from the west and fr the border States, where the desolations of war with the rebels and the Indi had destroyed the crops of the preceding year, gave me an early and l warning that it would be no light labor to comply with that part of the act quiring me "to procure and distribute new and valuable seeds."

Pursuing what I regarded as the most judicious and satisfactory cours imported from England, France, Belgium, Russia, Sweden, and other fore countries, several hundred bushels of choice wheat and other cereal grains, several thousand dollars' worth of the most valuable seeds for field and gar culture, including a large collection of such flower seeds as were deemed suita for our country. These, with an assortment of the choicest varieties of most desirable grains and vegetables grown in our own country, were spr over the country with a lavish hand.

In addition to these, about fifteen hundred bushels of cotton seed were p cured, packed, and distributed mainly among the farmers of the west. Th was, too, a very great demand made upon the department for tobacco se which was not readily found in many parts of the country, but which, fo nately, I was prepared to supply, and by which the wealth of our country increased millions of dollars.

Of the quality of these seeds and their products it is sufficient to say that reply to a question proposed to all the correspondents of the department a the seeds, the response was universal that the seeds were good and had p duced most satisfactory results. The whole number of packages of see cereals, &c., distributed is about 1,200,000. Of these over half a million w sent or given directly to those a ing for them. About 300,000 were tributed to members of Congr , d over 300,000 to agricultural societ About 40,000 were quart packa f wheat and other cereal grains; ab

garden and flower seeds; about 120,000 tobacco seed, and the re-
er cotton, flax, &c.

anxiety of the people of the country to obtain the seeds, and the satis-
ifested at their reception and the resulting productions, are a
attestation that the distribution of valuable seeds by the department
ed custom and duty which may not be abandoned, the complaints
or interested parties to the contrary notwithstanding; and I hazard
ing that in no department of this government does the expenditure
of a like sum confer upon so large a proportion of the people anything like the same amount of pleasure and substantial enjoyment.

The propagating and experimental garden, a most important branch of this department, in former years suffered much through incompeteney and neglect. In order to remedy these evils, and in so far as it may be possible to make up for lost time, I have taken great pains to secure the services of a gentleman eminently well known in that department of science needed to carry on successfully the experiments to be made.

During the year there have been distributed from the garden of the department about 25,750 articles, comprising vines, bulbs, cuttings, and plants. About one-half of these were distributed through members of Congress; the remainder has been sent for dissemination by agricultural and other rural associations.

While the introduction and propagation of new and valuable plants will always command a large share of attention as one of the principal objects of the garden, still it is believed that investigations having in view a more thorough knowledge of the diseases of plants, especially with reference to those of our more valuable and generally cultivated fruits, should receive more attention than formerly. Acting upon this belief, and being convinced of the immense importance of the grape crop as a fruit for general consumption, and more particularly in view of the extraordinary increasing interest now developing in regard to the production of native wines, an extensive correspondence has been opened with vineyardists in all parts of the country, for the purpose of comparing the results of experience and observation in regard to the influences of soil and climate, as also the effects of varied treatment and the estimation of varieties. Much valuable information has thus been contributed, embracing a collection of facts without which it would be impossible to reach intelligent conclusions.

It has been considered advisable, as one of the best modes of extending in-
in pomological and horticultural pursuits, to establish examples in order
hibit practically the results of varied modes of treatment and applications
s. This feature is being extended, and is found to be of peculiar and
in to visitors, and its results have already been repeatedly acknowl-
by tl e most capable of appreciating such efforts.
limi facilities of the present garden greatly retard the full develop-
bject. It is highly necessary to establish specimen orchards of
s, in order to illustrate the best modes of culture, and arrive at a
lge of the nomenclature of varieties of fruits. This want is now

severely felt, and its fulfilment would be hailed with genuine delight by all who are fully alive to the growing importance of fruit culture.

The purposes of the garden, as a proper auxiliary to the department, will n be fully answered until a botanical collection and museum is established. It a source of well-founded surprise by visitors to the capital of the nation that systematic attempt has been advanced having in view the foundation museum of native vegetable products, or a general botanical garden of plan

It is daily becoming more and more apparent that, in order to fully carry the objects of this department, increased facilities must be secured for the extended cultivation of agriculture for the purposes of comparative experiment. In no other way can we arrive at the intrinsic value of new introductions, except by comparing them with those whose merits are already well established. Again, with reference to the varied operations and practical details of farming, the various implements employed in the cultivation and amelioration of the soil, the advantages or disadvantages of thick or thin seeding, under what condition and with what crops they may be followed, the effects of draining, and the best and most economical modes of providing it, are only a few of the more immediately obvious subjects affording matter for study and investigation. To accomplish more fully what I deem to be necessary for the full development of this branch of the department, it will be necessary to increase the glass conservatories and propagating houses, for which I have asked an additional appropriation.

I long ago perceived that the few acres of the propagating garden were qu too limited for the need of this department in its present organization, and that much more land would be required to carry out my ideas of what experimental ground should show. To do this effectually, and essentially for the benefit of the farmers of the country, there should be placed at the control of the department land enough to test the various grains, grasses, and seeds of every kind that may be offered, to try their genuineness, their soundness, their value, and the adaptability of any foreign ones to our own use.

I have especially felt the want of this the past year, when suggestions have been made as to the practicability of growing various trees, shrubs, medicinal and especially textile plants, either from foreign parts or spontaneous prod tions of our own forests or swamps, and it has seemed quite impossible to fu that paramount duty, so emphatically set forth in the establishing act, "to by cultivation, the value of such seeds and plants as may require such tests, t propagate such as may be worthy of propagation, and to distribute them among agriculturists."

The Commissioner of Public Buildings, appreciating the difficulties un which I labored, very kindly gave me authority to use that portion of "re vation No. 2, between Twelfth and Fourteenth streets west," of govern grounds, and I at once made preparations to bring it into suitable cultivati when I was notified that the use of it was essentially necessary to the Department as a cattle yard.

L . wever, that this want will be but temporary, it is hoped that rill m :e a permanent appropriation of it for the use of this depart- m ent means for its improvement.

I being one of the subjects mentioned in the act establishing this , and the destruction of fruit and other crops by insects having now , I determined to make it an important branch of the depart- ave employed a gentleman well known throughout the country as a omologist, who has been paying special attention to the best ex ing insects injurious to vegetation. Through him I have made s to place on exhibition, in the department, his large collection of ompanied with drawings and descriptions; also his valuable collec- f *fac similes* of all the fruits of the country, together with his complete

the space assigned to the Department of Agriculture, of a half dozen the basement under the Patent Office, is too limited and inconvenient any rtment of this government, and it is not only insufficient for our ccommodations, but is a positive bar to any increased operations which , and I call your excellency's attention to the matter.

C aving, at its last session, appropriated "$20,000 for investigations t t .p ticability of cultivating and preparing flax and hemp as a sub- for c n," I proceeded to carry its intentions into effect as soon as the op on became available.

I , by communications from every part of the country, that much in- was felt in the matter, and that the people of the middle and western St especially, did not confine the meaning of the appropriating clause merely to t paration of flax for cotton machinery, but took the broader view con- the cultivation and preparation of flax generally, and with reason, grow- hey do, nearly all the flax in the country. With the view of placing nv gation beyond all reasonable complaint or suspicion of partiality, I d to intrust it in the hands of a commission, and accordingly, on the July, appointed Hon. J. K. Morehead, of Pittsburg, Pennsylvania; W. y, of Providence, Rhode Island; and Dr. J. A. Warder, of Cincinnati, as commissioners, whose names are a sufficient guarantee of industry, , and integrity.

T c mission met at the department, and, having organized, passed the vote, which was duly published in the papers, and, by circulars, s d throughout the country:

Resolved, That the Commissioner of Agriculture be requested to issue an advertisement, otherwise, calling upon manufacturers and experimenters to send to this de- r before the 20th day of November, samples of the fibres and fabrics prepared be accompanied, in all cases, by precise statements as to the various processes, ties as to the probable expense per pound of the preparation of the material, prop n of fibre that may be produced from a given quantity of the stalks or and h ."

m then adjourned to meet here early in December, when, after t, a report will be rendered to Congress.

In the hope of having, at some future day, the means and conveniences introducing and testing foreign trees, plants, and vegetables, I have taken g pains to establish communications with our consuls residing in foreign] and with great success. Many of them replied promptly, and forwarded (ble specimens of seeds and plants, and much valuable information.

I desire especially to express the obligations I am under to the State De ment for furnishing every facility for these communications, and for its tion and promptness in forwarding to this department everything of in the agriculturists of this country.

The balance of the appropriation for the fiscal year ending June 30, 1 remaining unexpended on the 31st of December, 1862, was $25,675 98; ficiency appropriation, (March 3, 1863, chapter 79,) $20,000. The amou propriated for the fiscal year ending June 30, 1864, is $95,000, (February 1863, chapter 59.) The expenditures from the 31st of December, 1862, to 30th of November, 1863, for all purposes, amount to $87,792 96, leavi unexpended balance of the appropriation for the fiscal year ending Ju 1864, of $52,883 02.

In reference to the special appropriation of $20,000 "for investigati test the practicability of cultivating and preparing flax and hemp as sul t for cotton," I have the honor to report that, up to this time, no portion of has been expended.

In asking of Congress an increased appropriation for the next fiscal y desire to notice, very briefly, a statement frequently made by some of our p men, that agriculture does not need or desire legislative aid in any respect; other words, that farmers only wish to be let alone. No doubt agricultu object to injurious legislation as much as any other class of our citizens; when the government aims directly to benefit the farmer, leaving him, howeve free to accept or reject its aid, by the introduction of foreign stock, gra grasses, roots, fruits, and other products, by imparting valuable information the result of chemical analysis, of experiments in culture and machinery, b gathering and diffusing throughout the country valuable statistics relating home and foreign crops, showing the excess or diminution of the same, in ord to guide the farmer in the planting and disposal of his grain, there is no q tion as to their approval.

One of our ablest public men, in speaking of agriculture as it exists in po tions of our country to-day, makes the following remark, over which eve farmer and legislator should ponder: "If St. Paul worthily had his spi stirred within him by the senseless idolatry of polished, intellectual Athens, feel that an honest man, who knows what agriculture might and *should be* the United States, can hardly restrain his indignation in view of what it q commonly is. To look over an average farm on this Atlantic seaboard, and its owner gravely ploughing around and over the same stones that his g grandfather ploughed over a century ago, when they should long since have b removed, or the fields containing them given up to the growth of timber—gr ing two hundred bushels of corn per annum on ten acres, when he might gro

that quantity so much cheaper on four, I feel that patience with such infatuation is scarcely less than a crime."

No ing mind can but admit that there is too much cause for manly in- on at the condition of agriculture in portions of our country. Still, I be- time is past when even a respectable minority of our farmers *wish to be* e, or are indifferent to the progress made, and to be made, in their voca- The only class of farmers who wish to be let alone—and this wish is the ignorance—but who ought, of all others, not to be let alone, for the sake country, their calling, and themselves, are those described above. There d, it is true, prior to the opening up of our country to a home and rket by railroads and canals, when even a better class of farmers were to follow the old systems of tillage, chiefly because there were few oppor- or improvement, but little intercommunication, and no markets. But gr and increasing demand for all the products of the farm at the present , as well as the wider range of domestic wants and comforts, together with intellectual and material resources of the farmer, have developed a general for agricultural knowledge and aids, in order that the farm may be made e attractive and productive.

Now, the individual farmer, however desirous he may be to avail himself of every agricultural help, cannot always do so unless he is aided by some associated effort like the Department of Agriculture, where legislative aid, extensive correspondence, time, and ability are combined for purposes of experiment, for the collecting and distribution of seeds, plants, roots, grasses, information, &c., &c., for the following reasons:

In the first place our country is so vast that many farmers, if left to their own resources, far distant from the great centres of the republic, are deprived of association at fairs and elsewhere, with intelligent agriculturists, or of procuring the best stock, seeds, implements, and information.

Again, the majority of our farmers, though thrifty and ambitious to excel, unable of themselves, for want of time, means, or ability, to make those experiments and investigations which have done so much to develop urces of the soil, and thus the wealth and prosperity of the nation.

Thirdly, it is impossible for isolated individuals to collect and arrange for use the vast stores of agricultural information and statistics which are gathered by associated effort, and which are to stimulate and direct agri- l pursuits, as well as guide legislation.

T much cannot be said in favor of agricultural statistics. They form the w ch is to unlock the hidden treasures of maturing nature, or the chart to reveal to the husbandman and merchant the great laws of demand y—of tillage and barter—thus enabling both to work out a safe and sperity. Indeed there is no logic so irresistible as the logic of sta- , in this country, those relating to agriculture are of the highest ; and I am convinced when the agricultural statistics of the United perly collected and arranged, and thoroughly studied by our

people, no other argument will be necessary to stimulate our farmers to l excellence, or to induce our statesmen to give to agriculture all possible l lative aid.

Sir John Sinclair, the friend and correspondent of Washington, in ur upon legislators the importance of agriculture, advocated the widest p diffusion of knowledge on the subject. To preserve the fertility of the to free it from the superfluous moisture; to cultivate it to the greatest tage; to raise its products at the least expense; to gather and apply th manures; to procure the best instruments of husbandry; to select t stock; to feed them in the most judicious manner; to secure the harvests, in the most unpropitious seasons; to separate the grain from the straw economy and success; in short, to perform all the operations of agricult the most judicious manner—these are the points, with those before mentio to which the Department of Agriculture devotes its attention, and for accomplishment of which it asks legislative aid. Everything which has a tendency to benefit the tillers of the soil is an advantage to the whole c munity, for their interests are reciprocal and inseparable; and as the ge good is unquestionably promoted by the fostering of the agricultural inter it becomes the duty of those who are intrusted with the management direction of public affairs to give special attention to this great interest wh lies at the foundation of our national greatness.

If we examine the history of those foreign countries, ancient and mode which have attained the highest agricultural prosperity, it will be found every one of them was generously aided by the government; and, on the contrary, where legislators have neglected the interests of agriculture, their countries are backward in wealth, intelligence, and prosperity. Indeed, the above observation is true in regard to the various States of our republic, where leg lative aid has been extended or refused.

But agriculture should be fostered by our government just now on other and higher grounds. Agriculture feeds not only our own and other nations, but the subsistence of our immense army and navy; and the revenues on which the government relies for the payment of its immense current expenses, are derived, directly or indirectly, from the productions of our soil. And the more and the earlier we can increase these productions by the appliances of science and art, and by introducing improved seeds and valuable articles of produce, the easier and the sooner will the public debt of our country be extinguished. By such agricultural progress, not only will the yield and value of the soil per acre be increased, but also the value of the products themselves will be enhanced, and we shall be better enabled, year after year, to compete with other nations in supplying food to the millions of Europe, thus gathering wealth in return, and making our country, more than ever, the granary of the world, and our farmers the stay and staff of our government in all the vicissitudes of peace or war. Besides, agriculture is the great conservative element or interest of the republic. It is the parent of the physical and moral health of the state

ronage by the government *will certainly* increase its products. And, r, since agriculture is by far the most extensive and important interest country, and represented by much the largest body of citizens, it is y unjust to neglect this and foster inferior interests.

uding my report, and in calling attention to the excellent agricultural of my countrymen accompanying it, my thoughts turn naturally of our beloved country. That future, to my mind, is full of xt if not this generation. Nations, like men, are made strong elf-reliant through trial, and unless our conscious and growing strength us to military excesses abroad, our greatness is secured beyond all per- A mighty giant, resting firmly on the soil and acquiring develop- gth by toil, by thought, and by equity, our republic will domi- n continent and adjacent seas, and command the fear and the ll nations.

ISAAC NEWTON,
Commissioner of Agriculture.

To His Excellency ABRAHAM LINCOLN, *President.*

AGRICULTURAL EXHIBITION AT HAMBURG.

BY DANIEL NEEDHAM, OF VERMONT.

nternational exhibition at Hamburg marks an epoch in the history of ıtion. Although an experiment, it was successful in every particular. international exhibitions had been holden at London, at New York, at but Hamburg was the first to inaugurate such an exhibition of a agricultural character. It was a noble compliment to the art of arts underlies all individual and national success, and forms the support and of all national greatness. Many there were among the most hopeful of the exhibition who questioned its merits, but the merchants of , who never hesitated after the first proposition was made, applied es with indefatigable energy to secure for their beautiful city the honor achieved a signal success in the holding of the first international based solely upon the results of agriculture. The chief among wno for many months had infused life and vigor into the busy acts of ; who had been the great centre around which the merchant princes g had gladly revolved; who had been the light under the influence rmen h step had been taken, but a few brief days before the complete ıt of all his hopes and labors in this behalf, was followed to the silent o by a concourse of mourners whose heartfelt sorrow was written in no btful characters upon their countenances. Baron Merck had been the first propose, and the chief to execute the great plan; and when weeks had d to days before the grand opening of the exhibition, and hope was fast ng to fruition, and the gathering people at Hamburg had already swollen titudes from Great Britain and all continental Europe to witness the of the plan made and brought almost to a full maturity by this master hose who would have cheered his passage through the streets of the city, and showered boquets upon him as he passed beneath the windows alatial dwellings, followed as silent mourners to his quiet grave.

sudden demise of Baron Merck made many sad days for Hamburg and itude of strangers. Pity it was that one who had done so much, who nned so skilfully, who had labored so indefatigably and disinterestedly lf of the great exhibition, should not have lived to see how perfectly conception was developed.

expense was spared to notify the civilized world of the contemplated Circulars and posters, printed in every spoken language of Europe, were adcast, by mail and express, wherever facilities permitted. Thousands were printed in English, and distributed from New York to the breeders, and mechanics of the United States. Nor were the in- held forth of an ordinary character. Large premiums were offered, t rare opportunity of exhibiting, at one of the grandest entrepots n, specimens of valuable breeds and the results of mechanical ry.

l ticularly was the invitation of no every-day character. To with her thousands of inventions for lessening agricultural

labor, with her cheap agricultural implements designed for the people an at a price bringing them within their reach, with the untrammelled which ever in her infancy had made her a beacon-light to the Old Wo opportunity was one which we should not have failed to improve to our u extent. But with a cruel rebellion taxing our resources, with a million telligent artisans, mechanics, and farmers on the field of battle, with the d of foreign interference which at times darkened our horizon and threa protract the great struggle of liberty with slavery, it was not strai Congress should neglect to make an appropriation for an internatio bition, or that our manufacturers, whose workshops were already crowded unfilled orders, should have failed to send large numbers of specimens of handiwork and skill. Could Congress have realized the inexhaustible re of the nation, could it have appreciated the readiness with which a free p have sprung to the support of a free government and free institutions, no an ample appropriation would have been made, and a government sl spatched from the great metropolis of America, freighted with the fruits c agricultural and mechanical industry. Such a demonstration at such a would have aroused the people of the Old World to something of our ciation of the vastness of the resources of our great and prosperous co Well, indeed, would it have been could some fine American frigate have achored in the Elbe, with the stars and stripes floating from the mai during the period of this great festival, that the gathered thousands f Europe might have seen that in the midst of this terrible rebellion, and we were enforcing a blockade on a coast of three thousand miles, ou ernment had ships and money to devote to the great arts of peace.

The President, however, was not unmindful of the great opportunity o and without any appropriation to cover the expenses of a commission pointed the Hon. Joseph A. Wright, of Indiana, to discharge that respo labor. The letter of the Secretary of State covering this appointment c Wright cannot be out of place in this connexion.

DEPARTMENT OF STATE,
Washington, March 28,

SIR: You are aware that the President communicated to Congress, at its late sess invitation from the government at Hamburg to the government and citizens of the States to participate in an exhibition of agricultural products, machinery, and the like is to be held in or near that city in the course of next summer.

No appropriation, however, was made to defray the expenses of any such participa our part, nor was any authority granted on the subject. The reasons for this need adverted to. They will easily occur to a gentleman of your experience in public life apparent indifference of Congress, however, in regard to the matter, cannot reason imputed to any insensibility in regard to whatever may tend to the advantage of the tural interests of the country, or to any coldness towards Hamburg itself, with which closely connected by commercial and other ties, and which we acknowledge to be a c nity with every title to respect.

Notwithstanding, however, this apparent neglect of Congress, the President is un that the United States should be without any representative on the occasion refe Moved, therefore, by a regard for your standing and character at home, and particul the practical interest which it is understood you take in agricultural affairs, the Pr desires you to repair to the exhibition at Hamburg, and there take charge of the inte such citizens of the United States as may become exhibitors on the occasion. It is to tinctly understood, however, that no expense to the United States is to be occasioned b and that your own services will be gratuitous.

I have the honor to be, sir, your obedient servant,

WILLIAM H. SEWA

Hon. JOSEPH A. WRIGHT.

Although government furnished no direct aid, and there was no c of action among the people, the circulars distributed throughout the loyal kindled an interest which increased with every passing day, until the laden with America's handiwork had sailed for Hamburg.

New York, Connecticut, New Jersey, Rhode Island, Illinois, and Vermont, representatives to show their great good will, and note the progress of cultural development. One of our distinguished sheep-breeders sent speci- of] flock, and a few of our inventors and manufacturers samples of . i icultural machines and implements. While the effort was being o ner these evidences of American skill, merchants of New York and i in consonance with their well known liberality, contributed about . dollars to defray the expenses of transportation of all articles is be forwarded. Independently of this, the German merchants, , . citizens of New York made a liberal donation, including a com- ient of agricultural implements. Thus, without direct aid from overn nt, and principally through the influence of the tireless labors of n Baldwin, of New York city, a very general interest was awakened, and x table exhibition secured from the United States.

No re accessible point could have been selected for an international exhi- . the city of Hamburg. Hamburg is an independent republic, and a of the German Confederacy, with an area of one hundred and fifty re les, and a population of more than a quarter of a million. The city c ourg is the capital of the republic. It is the principal city of Germany, hird in trade and commerce of the cities of Europe. It is one of the four anse towns, and contains a population of nearly two hundred thousand. It is fully located on the north bank of the Elbe, at the mouth of the Alster, and enty-three miles from the German ocean. The Alster forms two beautiful s—one on the north of the city, and designated the Ouster Alster; the r within the fortifications of the city, and known as the Inner Alster. These beautiful lakes add greatly to the beauty of the city, while they con- ite, by furnishing a ready means of transit to the suburbs, to the comfort luxury of the people. The city was formerly surrounded by fortifications, still entered by gates, which are closed at night, and at all hours of both ay and night guarded by a military police. The most beautiful part of the is that which surrounds the Inner Alster.

Hamburg has railway communication with all parts of the continent, and, by s and sailing vessels, keeps up commercial relations with all the lead- ts of the world. During the year 1859 there arrived at this port four d five hundred and fifty-four (4,554) sea-going vessels, representing colors of twenty-five nations, and in 1860 no less than five thousand and y-nine (5,029) sea-going vessels, representing twenty-six nationalities, ved at the port of this flourishing European city. During the years of -'60, including all the arrivals from the rivers and seas, fifty-eight thousand t hundred and nineteen (58,819) vessels arrived in the former, and fifty- thousand nine hundred and sixty-two (59,962) in the latter, year.

The commerce of the city is rapidly increasing. In 1852 the imports $125,449,222, whilst in 1857 the imports had increased to more than ,000,000. The exports, during the same period, correspondingly in- d. A commercial treaty was established with Lubec as early as the 1214, and this treaty laid the foundation of the Hanseatic league. It was e a free city of the Germanic empire in the year 1770, and united itself to Germanic confederation, as a free Hanse Town, on the 8th of June, 1815. burg is not only the chief port of Germany, but to all northern Europe. than one hundred millions of the people of northern Europe can be sup- with necessaries and luxuries through this port, more readily than by other channel of communication. Less than four hundred miles of water te it from the coast of England, and five hundred from the great mc- of t world, with which it has daily steamship communication. Thus s a fit place for an international agricultural exhibition. The grounds were on the outside of the city limits, and covered more

than eighty acres. Laid out with marked taste and skill, they not only lighted the eye with the exquisite beauty and symmetry of their design, met the entire wants of the exhibition.

Eighty buildings, some of them three hundred feet in length, were ar in groups, and otherwise, for the accommodation of stock, farming imple machinery, seeds, and the products of the earth. At the entrance, a co arch symbolized the triumphs of agriculture in blessing, civilizing, and ing mankind.

Among the four banners at the royal entrance, we saw with ple pride the stars and stripes of our native land. Immediately inside of the gr entrance was an artificial fountain, sending its jets of cool water fifty feet the clear air, and falling in pearls of feathered spray, which gave a refresl coolness to a July temperature. On either side of the fountain were arran with artistic elegance tens of thousands of flowers and roses—roses of wl and red, and yellow, growing from bushes whose high tree-shaped tops g a most delightful shade in the day's decline; dialytras, fuschias, and br leafed panzies, with countless other flowers, loading the air with rich and cious odors, were so placed as to delight every eye, and secure from every words of admiration and delight. A little beyond, and in a line with the fo tain, stood a high circular edifice, richly ornamented and painted, with a l gallery, from which floated more than a hundred flags and streamers. was the orchestra; and from early morning until late in the afternoon a b of fifty musicians poured their sweetest strains upon the perfumed air, w thousands of listeners seemed chained to this spot as though the combi of roses and musicians, odors and music, had produced enchantment. In back ground stood the banquet hall, a building of fine proportions, substanti built, and extensive enough to seat at table more than one thousand gu In this hall the first meeting of the judges took place; here the first speec welcome was made by one of the executive officers, and a free entertainr provided from day to day for all the members of the various committees. headquarters of the delegates and commissioners occupied three buildings in diately in the rear of the banquet hall, the name of each being painted in l letters over the door of every room. These rooms were nicely furnished, arranged in a very convenient manner. In the room set apart for the "I girte aus den Vereinigten Staaten von Nord Amerika," which, being i preted, signifies the "Delegates from the United States of North Ameri not only did the delegates meet, but it was the grand gathering room of American exhibitors and visitors. Here was many an anxious wish expre to hear from our dear native land, four thousand miles away; and here it that we first received with enthusiastic welcome the telegraphic despatch nouncing the surrender of Vicksburg.

On the ground, at the right hand from the main entrance, stood a she enormous length, devoted exclusively to poultry. The coops were all filled, and the variety of fowls extensive. Dorkings, Malays, Cantons, Ch gongs, Cochin Chinas, and game; domestic and wild turkeys; Egyptian, men, and wild geese; and ducks of high-sounding names, aided in makin the great collection.

The contributions to this department numbered three hundred and forty, were furnished by eight distinct nations. In front of the poultry shed w group of three long buildings, filled with every variety of products: W from England, France, the Baltic, the Mediterranean, and all the countrie Germany; corn from the south of Germany, from France, and the Un States; seeds in almost endless variety, neatly packed and labelled, in g jars; wool from all parts of central and northern Europe, from South Ame and the United States; cotton from the East Indies; flax from Denmark, United States, Belgium, and England; and the products of the earth in f

sufficient to represent the soils and climates of thirty different na-
nis, the most difficult part of the exhibition to arrange, was methodized
st careful and perfect order, every article being labelled and numbered.
farther on were the sheep pens, a group of long, wide sheds, parti-
the centre, lengthwise, giving ample accommodations to more than
sheep. All the best breeds of Europe were represented. Here
nos from Prussia, Saxony, France, Silesia, and the United States;
broad backs, full bosoms and buttocks; with round bodies and
nd necks; with short legs, wide apart, straight and strong;
neavy folds and wrinkles, with wide dew-laps, plaited or smooth;
with heavy folds on the neck, and thick, even wool; Merinos with
ple and uneven, with a combination of thickness and length, with
low down on the knees and hocks; Merinos of all sizes and weights,
ens of little Mechlenbergs to pens of tall, heavy French, weighing more
wo hundred pounds. Every variety of Merino was there, and as we laid
the fleeces of sheep after sheep in this class, and noticed the difference in
in weight, and in form, and in length, thickness, and quality of staple, we
ed if it was possible that this great variety had sprung from the same
Beyond were pens of South Downs, and Leicesters, and Cotswolds,
reat Britain and many continental countries, with longer and coarser
; some of them of enormous size, too heavy to stand, and too indolent to
either by the motion of head or tail, their dislike of the uninterrupted
examinations of visitors. The small quantity of hay and grain fed
o these fat sheep was quite surprising. The shepherds from England
y intelligent in matters appertaining to the breeding and blood of sheep,
ond their occupation, had little knowledge of the world.

To the rear of the sheep pens, and at the left of the banquet hall, were the
pens. They were ample in space and number. Here were pens of noble
horns, a breed which has commanded universal admiration for half a cen-
, and whose origin can be traced a hundred years. They were principally
England, Scotland, Prussia, and Sweden. The fine heads, full, promi-
nostrils, bright, mild eyes, long, broad, muscular necks, deep, projecting
, short fore legs, wide, even hips, mark the breed with great distinctness,
the crowd constantly surrounding these pens indicated the short-horns as
favorite cattle. A bull from Suffolk, England, which took the first prize
wo hundred thalers, was an object of universal admiration. With his mild,
t eyes he looked upon the crowd who were pressing his soft, velvety
with their fingers, and almost impressed them with the belief that he was
ctually conscious of his superiority.

A beautiful cow from Suffolk, and another from Yorkshire, England, had
the same points in the main, but with more tapering, thinner, and lighter necks.
The Suffolk cow took the first premium of one hundred thalers, and the York-
shire cow the second premium of fifty. So nearly equal were the merits of
these two animals, that the judges were nearly divided in their opinions, and
reached their final conclusion only after a long and careful examination and
discussion.

In this department the animals were all meritorious, and it was only after
st patient examination that the judges made their decisions. The Ayr-
were not as numerous, but the pens exhibited a goodly number, and the
nens of their class. Some were red and white, giving a bright con-
colors. One was nearly all red; another was a brilliant strawberry.
s were small and clean, with long faces, narrow at the muzzle, and
, ai expression. They had small eyes and short, slightly curved
ir backs, broad across the loins, and fine, long tails, bushy at the
took all the prizes for Great Britain and Ireland, and Mecklen-

burg and Hanover monopolized the premiums awarded to the cattle in t exhibited from the continent.

Several other distinct breeds were on exhibition, some of them much largely represented than either short-horns or Ayrshires, but none of commanding such universal praise. Hollands and Oldenburgs made show, and justly took all the premiums in their respective classes. No ican could examine these fine breeds of cattle without feeling that at l needed more careful breeding in our cattle, and that, at the best, require many years before America would be able to compare her bu and oxen with those of the Old World.

The stalls for the horses were in the most remote part of the ground. variety of European horses was on exhibition. The heavy, stout-limbed horse, with enormous feet and head; the nimble, tall, long-necked E race-horse; the long-limbed, arch-necked, smooth-haired carriage horse here in large numbers. These horses were all heavy, varying from hundred to fifteen hundred pounds. In the department of horses, in ponies were included, some fifteen nations were represented. Englan her full share of premiums here as elsewhere. Many times we wishe two or three of our best Morgans could have been there to exhibit poi value in roadsters which were entirely wanting in every carriage ho exhibition. There can be no doubt but that the Morgan horse would make himself a favorite in the countries of Europe. The whole la breeding for roadsters appeared to be to secure a high horse, and we assured over and over again, by horse-breeders, that no other style of would command the markets, although it seemed well understood tha long-legged animals had less endurance than horses of a less weight.

There were many horses from Hanover, representing the European c horse, but they were not very unlike the English carriage horses. The bred to a short gait, and had a steady and graceful motion. There trotting course connected with the exhibition grounds, and the horse shown without carriage or harness, led by a halter in a circular enclos one hundred and fifty feet in diameter. This manner of exhibiting fa produce much enthusiasm or general interest. The judges, with a sma pany of spectators, not often numbering five hundred, had plenty of ro observation.

The swine were exhibited in pens, constructed in the same manner a the pens for the sheep, and near the sheds occupied by the cattle. The shires attracted general attention. Their finely-shaped heads, small bon capacity for taking on great thickness of fat, has given them a good rep on the continent, and among breeders and farmers generally they are fa Two hundred and twenty-five Berkshires were entered, and a good sl premiums were taken by England.

A few pens of little white and black Chinese excited considerable cu These were very small-limbed, round in the carcass, thin-skinned, and bristled. Their heads were so deeply imbedded in the neck that in so stances their appearance was almost ridiculous, nothing but the snou perceptible at a side view. But it was said they were tender and diff raise, the sows being very poor nurses. Their hind quarters were ver in proportion to their bodies, and their weight, when fatted, seldom e two hundred pounds.

Some pens of pigs from Hanover and Mechlenburg, resembling Ch but not entered in that name, were very creditable specimens of th They were of various colors—blue, black, and white, with great hea long, pendant ears. They were very long, flat-sided, and narrow; large long-legged, and, on the whole, ill-shaped. But they were in fine co and could easily be made to dress six or seven hundred pounds. claimed that they fatted easily and were a profitable breed.

principal breeds of the continent have been bred from Great Britain nd. The premiums ranged from twenty to fifty thalers, and out of y-nve premiums awarded, strange as it may seem, twenty-eight were taken y Britain.

At right hand of the banquet hall, extending from the enclosure on the st to the rear of the ground, were twenty-four long, double-roofed appropriated to the exhibition of agricultural implements and light r. Over each shed hung a sign, upon which could be read the name on whose products of skill were therein exhibited. Midway of the row was the American shed, in which most of the American contributions were arranged: corn brooms, dusters, and brushes; pots and cans of preserved an fruits; McCormick's reaper, the same which took the gold medal at world's Fair in London; harrows, seed sowers, root cutters; hay and re forks; hoes, ploughs, cultivators, horse hoes, horse rakes, and other ents of agriculture, were hung up and set about in such a manner as to the entire shed. New York contributed a large proportion of this collection, but Pennsylvania, Illinois, Rhode Island, Indiana, Massachusetts, Michigan, Ohio, and Vermont, were all represented. Great Britain filled three long buildings with her light machinery and implements of husbandry, cutlery, ploughs, harrows, horse hoes, and potato diggers in great quantities; many curious and elegantly made implements for amateur farmers—costly and of little practical value.

Sweden, Denmark, Prussia, Austria, Hanover, Hamburg, Canada, Belgium, Holland, Uruguay, and Venezuela, were all here, occupying space in the great rooms, and they looked larger and more important than they ever looked before. A little German State impressed us with a new and enlarged idea of its importance as we looked upon a great building filled with the works of the mechanical skill and industry of its people; and having passed around and examined carefully the specimens of its handiwork, we felt increased respect for the little realm, the name of which we learned at school in our boyhood, but with which we had seldom met since.

As we noticed from day to day the great crowd gathered around the American shed, and observed with pride that the contents attracted more general interest than those of any other building on the ground, we could not but feel a regret that America was not there in her full strength to impress, as she should and could have done, all Europe, with the magnitude of her genius. America may well learn a lesson of Great Britain in this particular. She comprehends the value of such opportunities, and is not backward in improving them. Twelve vessels loaded with live stock and machinery ploughed the Ge ocean and the waters of the Elbe that England might be properly repr ited at the international exhibition. England covered a fourth of the s on the exhibition grounds. Was it machinery, lifting great volumes of ; massive engines, moving about the ground like huge elephants, or sta- ry engines driving the wheels to threshing and winnowing mills or moving hs through the dry, hard, clay soil—they were from England and of h manufacture to a very large extent. Twelve or fourteen acres were cu d by heavy machinery, and a large proportion of it English. That a n making such a demonstration should wield an influence of fearful mage over the governments of the world is a matter of little surprise. That ica could have made a demonstration of equal magnitude and merit, no conversant with its resources and the skill and energy of its people can un a doubt.

the 12th day of July, 1863, a magnificent breakfast was given to the s who had been appointed by the executive committee. It was u twelve o'clock noon, in the banquet hall on the ground. The judges by one of the vice presidents of the executive committee, and

at the conclusion of the address of welcome he alluded most happily to delicate and responsible duties the judges were appointed to discharge. "careful," said he, "to do justice without partiality, without prejudice. world has been invited to this exhibition, and all men who are here as e itors of live stock, of machinery, or of farming implements, are enti equal consideration. As I know no fear can intimidate you, so I am con no prejudice, either individual or national, will warp your judgment. world demands of you deliberate, honest decisions, and I feel assured the results of your deliberations those demands will be fully met."

The address, occupying about thirty minutes, was delivered with m earnestness and received with marked satisfaction. At the conclusion of breakfast the several committees met and organized by the election of a ch man and secretary. The United States were represented by two committee-men, one on manufactures and one on sheep. The committee on manufactures consisted of eleven gentlemen, representing seven nationalities; the committee on sheep, of eighteen gentlemen, representing eleven nationalities. The two gentlemen representing the United States were Austin Baldwin, of New York, and Daniel Needham, of Vermont.

At the conclusion of the organization of the committee on which it was my privilege to serve, I must confess to a strange surprise at the announcement of the chairman: "The judges will meet at this place to-morrow morning at six o'clock to commence their labors." At first I was quite disposed to regard the matter as a joke, but finding no joke had been perpetrated, judging by the looks of my associates, I concluded that I had misunderstood the announcement, and, at my request, the hour of meeting was again proclaimed "at six o'clock to-morrow morning." Determined that America should be prompt at the committee meeting, I left my lodgings at five o'clock a. m. on the 13th, with but four miles between myself and the fair ground. But my driver was stupid and his horses dull, and, greatly to my discomfort, the time occupied in reaching the entrance gate was precisely an hour. Alighting at the main entrance, I hurried to the committee-room, which I reached five minutes after the hour appointed. Every member of the committee, myself excepted, had arrived in time, and five minutes before my arrival they had gone to their labors.

On the evening of the 13th the executive committee gave a banquet at Street's hotel to the commissioners, delegates, and invited guests. At this meeting speeches of welcome and congratulation were interchanged until a late hour. It was an occasion long to be remembered. The banquet, in elegance and luxuriance, was all that art and culinary skill could make it. It was a banquet—a German banquet. Whoever has had the good fortune to attend one will appreciate the character and interest of this occasion; whoever has not, could get but a feeble idea of its magnificence from any words of mine.

On Tuesday, July 14, at precisely ten o'clock in the forenoon, amid the sound of bugles and the beating of drums, a thousand flags, representing all the civilized nations of the earth, were unfurled to the breeze from flag-staffs occupying every conceivable position on the buildings within the exhibition grounds. From the banquet hall, from every bureau, committee-room, and office, from every shed and stand, from the arch and gate posts of the outer and inner entrances, were these splendid emblems of nationality raised to the bright sunlight, whilst from the gathered thousands there broke upon the air shout upon shout and cheer upon cheer, until, by their own hurrahs, the multitude had made themselves wild with joy; and this was the opening of the great international agricultural exhibition. The committee commenced their labors on the day previous to the grand opening, but it was intended that their work should have been commenced at a much earlier day, so that at the time of opening, the decisions could be announced. But on account of the death of Baron Merck, the original arrangement was necessarily changed.

ploughing match was one of the most important features of the fair. It nnessed by a large number of spectators, and took place on a field quite ce from the grounds on which the great exhibition was held. The horse and steam. We watched with great anxiety the results of with the horses, as several American ploughs were tried side by side English ones. As furrow after furrow was turned, we were con- to admit that in this department the English had the advantage. The n which the trial was made was a low meadow, mostly clay, very ary. The soil was in bad condition to show the best work from any There was no room for debating the result, however, for the American on trial did their best under the circumstances, guided as they were by ical American farmers. The steam ploughing was good. There were five de, all with stationary engines, and all from England. The ploughs arranged to cut from three to five furrows at a passage, there being two of shares to avoid the necessity of turning the plough. The engine, having upright drums or capstans, is set at a point in the field which may be the apex of the triangular space occupied by the apparatus. At each of the other angles is set a guide pulley, through which a strong wire rope was l from one of the drums to the other, and to this rope between the pulleys ploughs were attached. By the movement of the engine the rope was first around one of the drums and unwound from the other, and the furrow run through, the motion was reversed and the ploughs were run back in opposite direction. They were attached to a frame which was balanced the axle of a carriage, the guide pulleys being moved as required to the unploughed portions of the field. This ploughing was all admirably considering the condition of the ground.

The expense of the engine and machinery connected with the steam plough was from three to four thousand dollars. The movement of the ploughs could not have been less than three miles an hour. The first prize was awarded to John Fowler, of Leeds, England. Governor Wright, the commissioner appointed by President Lincoln, in alluding to this matter, uses the following language:

"Several unsuccessful attempts having been made in our own country to plough by steam, these trials received the especial attention of Americans present. Five ploughs were entered, cutting from three to four furrows at each course, in a highly satisfactory manner. I was convinced that if some modification was made by which the expense attending the machinery for this operation could be materially diminished, the introduction of ploughing by steam could be easily effected so as to be highly advantageous to the agricultural interests in many portions of the country.

"It is most manifest that steam is designed to play an important part in many of the branches of agriculture. In the opinion of your commissioner we have not been sufficiently mindful of the progress made in Great Britain and other portions of Europe in the improvement in agricultural implements, brought about by the sharp competition of the English manufacturer for the European market. We are content with our unparalleled success, and we may well say we are ahead of the nations of the Old World in machinery in its adaptation to the wants of the people, in cheapness and utility, in the great labor-saving machines of the day, threshers, mowers, reapers, grain cleaners, &c. Yet a few days' witnessing the steam ploughs and steam machines in operation upon the national fair grounds at Hamburg would induce you to say we are behind many of them in the application of steam to agricultural work. Whatever the wants of the present day may be, the time is not far distant when many portions of our country will require this wonderful element, if we shall fully develop the hidden res of rich but diversified country. So important did the steam plough appear, that s was procured from an eminent English firm to attend the first national ag- tion held in the United States with their steam ploughing apparatus, if an l be extended to competitors in this mode of ploughing."

T be no doubt that either of the steam ploughs would work with ction upon the prairie lands of the western States, but whether the ploughing can be made economical may be considered very ques-

Of the superiority of steam for the purpose of threshing, grinding, cutti roots and fodder, there can be little doubt. But it is a power, the use of wh must always remain beyond the reach of the ordinary farmer. Not only t expenditure connected with the purchase of an engine, but the expense a difficulty of repairs, and, with ordinary care, the rapid depreciation in are obstacles of no small magnitude in the way of general introduction of s apparatus.

RECAPITULATION.

In the department for horses some eight premiums were divided among hundred and thirteen horses entered for exhibition, the premiums rang from fifty to four hundred thalers. The entries in every class in this dep ment were highly meritorious animals. Although the horse is a leading feat of an American agricultural show, at this exhibition it failed to excite m interest than the animals of other departments. The grooming of the hor was constant. In no instances did a groom have in charge more than horse; and it was no unusual thing to see two servants, hours at a time, work upon the same animal.

There were nine hundred and four entries of cattle. Independent of th were two or three herds not entered for premiums. One hundred and fifty- prizes were awarded, ranging from twenty to one hundred thalers.

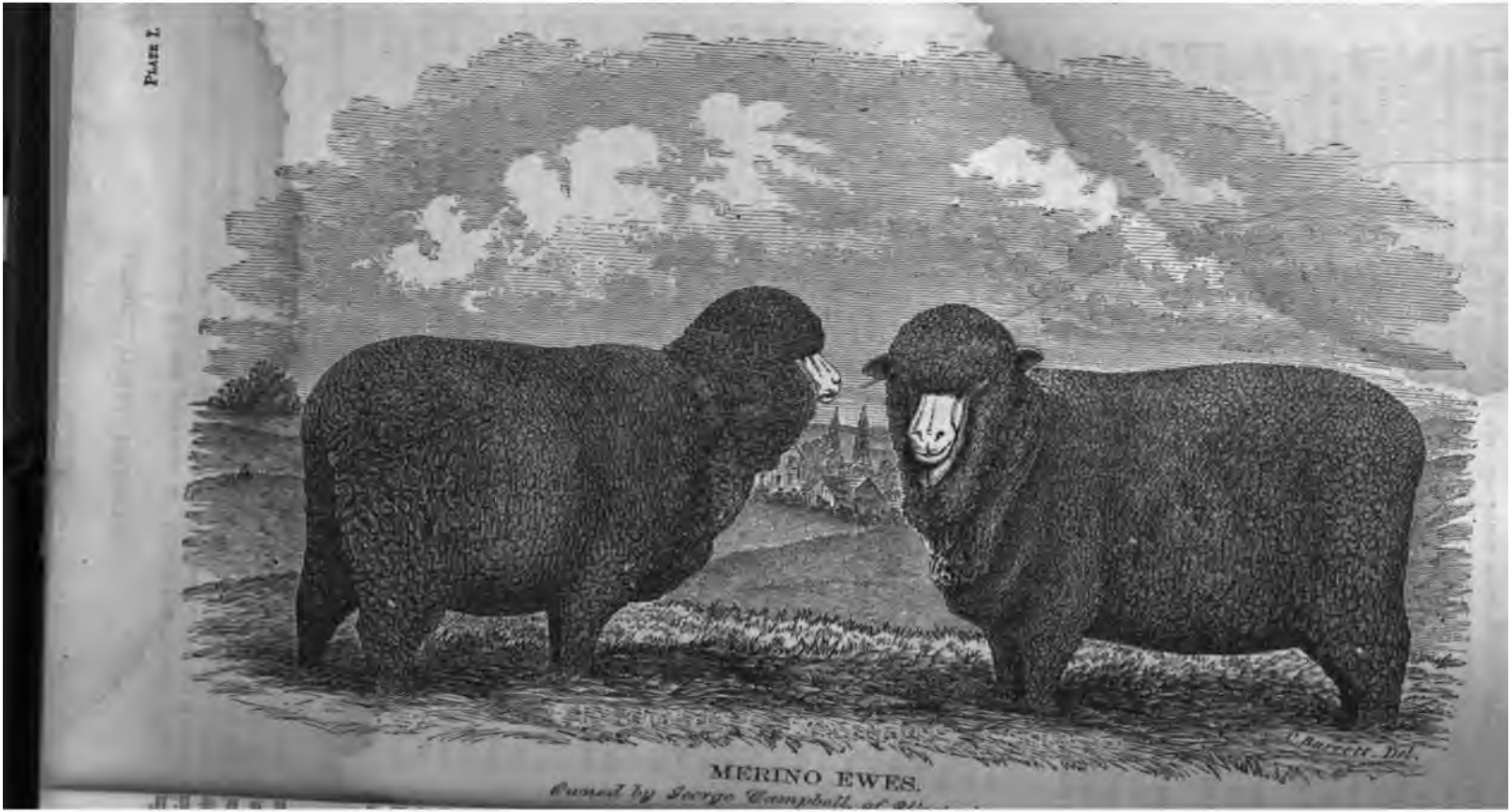
The number of sheep entered for premiums was seventeen hundred seventy-one. Some three hundred more were on exhibition, but not ente for premiums. Nine hundred and thirteen were of the class of Merinos, t hundred and twenty-four South Downs, three hundred and sixty-nine Leicest and two hundred and seventy-six Cotswolds. The prizes awarded to the sh varied from twenty-five to fifty thalers. Eighty-six prizes were taken, la numbers of which, in the classes of South Downs, Leicesters, and Cotswo were taken by England.

The class in which the American sheep contested was the Merino, and c tained three hundred and fifty entries. The American prize sheep called V mont Merinos took three premiums—two first and one second. One f premium was taken for length of staple; the other for weight of fleece. Th sheep were bred by George Campbell, of West Westminster, Vermont, were accompanied by him to Europe. No other sheep or animals were exhibition from the United States. Mr. Campbell was the only Ameri who dared to take live stock across the Atlantic and the German oceans, the results of skilful American breeding might be compared with those European breeding. The effort of Mr. Campbell was attended with g expense and risk, but he was well rewarded in the satisfaction which he ex rienced in gaining for America that which no other nation had given her cr for possessing, and which few of her own citizens appreciated was her the honor of breeding the heaviest fleeced Merinos, and Merinos having longest staples, of any in the world.

No greater surprise could have been created on the continent of Europe t was awakened by the announcement that the American sheep had taken first premiums in the class of Merinos. At first it was not credited by breeders and exhibitors gathered at the fair.

Not only had it been supposed that America would not take a premiun this department, but there was a general conviction, sympathized in by German press, that we could have nothing in the class of Merino sheep wl could at all compare with the celebrated flocks of Prussia, Saxony, and Sil all of which were fully represented. After it was rumored and gener credited that the twelve American sheep on exhibition had taken two prizes, the surprise was so great that a feeling of doubt and incredulity resp ing the wisdom and impartiality of the decision was quite apparent. De

PLATE I.



MERINO EWES.

Owned by George Campbell, of Ki...

hat this doubt should be removed, I proposed a sweepstakes premium
undred thalers, to be given to the exhibitor who could show the heaviest
the class of Merinos, the sheep to be sheared on the ground, in the
e of a new committee to be appointed, and the fleeces to be weighed in
sence of the judges and spectators. As none of the exhibition sheep
n sheared, this was a feasible and conclusive manner to determine the
ess of the decision of the judges. The proposition made was this:
ry party entering for the sweepstakes should pay ten dollars; if two
I would make up the balance of eighty dollars; if three, the balance
ty; and if ten, the whole sum of the sweepstakes would be raised by
Three days were given for entries, and they were to be made at the
n bureau, on the exhibition ground. After the lapse of the three days,
had entered but George Campbell, the American exhibitor. This fact
ublicly announced, there remained no doubt about the merits of the
t Merinos. It was subsequently stated by some of the exhibitors that
breeds of Europe were not at the fair.
twelve American sheep were afterwards sold by Mr. Campbell to Count
bors, of Silesia, for five thousand dollars. Thus was the public opinion
ed, that America not only had the most valuable Merinos on the exhi-
grounds, but the most valuable in Europe.
moral influence of this triumph was very great. The thousands who
thered around the pens of sheep on exhibition from the flocks of Louis
on, deserted the pens of the Emperor, and gathered in equal, if not
numbers around the Vermont Merinos. That the result of the exhibi-
this particular will be to give America a great trade in Vermont Meri-
d make her one of the leading sources of the world for fine-woolled sheep,
an be no doubt.
he month of February, 1864, I received a letter from a leading house in
ork city, informing me that they had received letters from German agri-
l societies, making inquiries relative to the cost of American Merinos.
ve no doubt," says the writer, "but that, owing to the impulse given by
amburg fair to various industrial pursuits in our country, the United
will be benefited, in less than five years, to the extent of millions."
ampbell informs me that the prize sheep were all descendants from the
ations of Jarvis and Humphrey, but mainly from the latter. In a let-
aring date February 18, 1864, Mr. Campbell writes to me: "In 1839 I
t twenty full-blood Spanish Merino ewes, which were direct descendants
Mr. Humphrey's importation. The same year I also purchased an equal
r of full-blood ewes, a cross of Jarvis's and Humphrey's stock. More
ly I have received very choice sheep from the celebrated flocks of Messrs.
ond, Sanford, Cushing, and other Vermont breeders."
e than three thousand farm implements and machines were on exhibi-
Seventy-five steam engines were used in operating the machinery. One
of eight horse-power, designed for drawing ploughs, attracted great
on. Its weight was ten tons, and was moved on a portable track, which
d with the wheels, the track being in pieces or sections, and attached
ndless chain. The pieces of track looked like huge feet, as in their
ion they laid themselves down for the ponderous wheels to pass over.
achine was easily guided by two small wheels in front. It moved itself
e speed of four miles an hour around the fair grounds, and in the open
utside. It was designed to draw six ploughs at the rate of three miles
. This machine was from England, as was a large part of all the heavy
ery on the ground. It was very noticeable that, while all the machinery
m implements from England were heavy and expensive, those from
a were light and cheap. Thirty-four nationalities were represented at
ibition in their contributions, including, among other things, four thou-

sand one hundred of the finest horses, cattle, sheep, and swine; several of the reigning sovereigns of Europe being numbered among the contributors. More than one thousand persons were contributors and competitors. After a most thorough examination, and the most carefully applied tests, before a very able committee, the United States maintained its superiority in reaping and harv ing machines. To C. H. McCormick, of Illinois, was the gold medal aw and was given to the same machine which took the first premium at the L don exhibition.

Twenty-six premiums were awarded to the United States, which, consi ing the small number of articles on exhibition from our country, was our proportion. Silver medals were taken by Seymour, Morgan & Co., of York, and by Thomson & Avery, of Pennsylvania. Bronze medals by J Kelsey, of Pennsylvania; John Vanderbelt, of New York; L. P. Rose, Michigan; J. W. Tree, of Indiana; Solomon Hubbell, of New York; A. Saxton, of Ohio; Whittemore, Belcher & Co., of Massachusetts; b. Allen, of New York; Hall & Spiel, of Pennsylvania; E. A. Tampton, Massachusetts; J. Redstone, of Indiana; Windle & Co., of New York; B. Johnson, H. G. Hotchkiss, Sylvanus R. Ward, and Hall & Parshall, of N York; B. M. Rhodes, of Maryland; and George Campbell, of Vermont. Me were also sent to the American prize judges, Austin Baldwin, of New Yor and Daniel Needham, of Vermont. It having been decided that all the judges of the exhibition should be rewarded in this manner, the American u gates were each honored with a Hamburg flag, to be presented by them to States which they represented as a complimentary testimonial.

One of the most important results of the exhibition was the establishm at Hamburg, of a museum of American agricultural machines and implement The German contribution from New York formed the nucleus of the muse to which was added, by donation from Mr. McCormick, his splendid reaper which surpassed in elegance of workmanship any machine upon the ground Mr. Kelsey, of Pennsylvania, also donated his harrow.

A contribution was made by the merchants of Hamburg, and a building sufficiently large to receive, for many years to come, specimens of American sk and industry, has been secured and consecrated to the purposes of our Amer can museum of agricultural implements and machinery. All inventors manufacturers of American machines are invited to contribute to this collection, which will perpetually remain a free exhibition to the people of the world.

This article would be incomplete should it fail to mention the name of Jan R. McDonald, an American merchant at Hamburg, who, from the day the fair was first suggested until its close, was unremitting in his labors in behalf of America and Americans.

At the close of the exhibition an opportunity was given to the American delegates publicly to thank the executive committee, not only for the opportunity the fair had given America to show her sheep and her agricultural implements, but for the uniform kindness and courtesy which had been extended to the delegates from our country. The meeting was held in front of the Americ shed, all the members of the executive committee and a large number of spectators being present. At the close of this meeting a formal leave was taken of each member of the committee.

Thus closed one of the most important and memorable exhibitions the genius of man has ever enabled him to hold.

MINNESOTA.

BY O. H. KELLY, ITASCA, MINNESOTA.

lden transition of Indian hunting ground into an organized Territory, n taking a stand in the front rank of northwestern States, directed ɪ ıtion to Minnesota. The change has been so rapid that even the the great work are surprised at the success of their labors. Immi- commenced pouring in in June, 1849, following the footsteps of Gov- Ramsey, who issued, in that month, the proclamation declaring the Ter- ly organized, and entitled to a delegate in Congress; and there was whelming flood of people, of all nations and from every clime, who mes within our limits. The tide increased yearly until 1862, when outbreak of the Sioux upon our frontier checked its progress, and the wave back with such force that, until this date, (March, 1864,) its effect is isible. Probably in the growth of States, with only agricultural and ing resources to attract the attention, Minnesota's prosperity will be lled; and I purpose, after fifteen years' residence here, to give a ı advantages we possess, by which we shall offer inducements to ; at not to be found elsewhere. And yet it will be far from my to picture Minnesota as a paradise, for it has some disadvantages also; ı ıy be overcome, while the advantages cannot be reduced, and can nanced in value. The great attraction to the first immigrants was pine districts, and the State of Maine was well represented, during 1850, among our population. In fact, during those years it was esti- mat more than one-half of the residents of our Territory were from the ing districts of the Penobscot. Our high range of latitude made it ı ble with some whether Minnesota could be an agricultural State, and ıtements were published detrimental to our agricultural reputation. It nsidered an experiment, and the sequel shows that it has been a suc- one. My observations in this paper will be chiefly confined to that por our State tributary to the Mississippi, above the Falls of St. Anthony.

TOPOGRAPHICAL FEATURES.

sota has an area estimated at 83,531 square miles, or 53,459,840 acres . Below the falls, the shores of the Mississippi are skirted with precip- ı rocky bluffs, while the country above presents a lower and more e, making a great and pleasing contrast to the eye of the traveller. ve e fine rolling prairies, oak openings, and extensive forests, well by lakes, and by small streams—tributaries of the great river. No s, and but few hills even, worthy of notice by a New Englander, are While at the falls and below, the country is well supplied with vast of limestone, we have no ledges for a distance of seventy miles above, ledge of granite crops out, extending twelve miles to Sauk Rapids, the steamboat navigation above the falls, at an ordinary stage of water, a steamboat has been up to the Falls of Pohegema.

SOIL.

shore, extending back from one to five miles, and as far north y, soil is quite sandy, with gravelly subsoil, yet productive.

Beyond this, towards and on Run river, a clayey soil predominates. Or west shore, and extending to our own State line, both north and west, and black loam of unsurpassed fertility invite the husbandman to deposi seed with good promise of rich rewards. I presume that the country n and west of the Falls of St. Anthony, as far as the British possessions, pre a greater variety of soil, and better adapted to the real wants of the fi than any like portion of the country in the west. It is often said by tra that three-fourths of the farms in this region are well supplied by natu wood and water.

PRODUCTIONS.

Both spring and winter wheat are raised in perfection; also oats, corn barley, buckwheat, hemp, flax, and tobacco; in fact, we never hesitate to any crop usually considered reliable in the New England States. Pot and all other root crops excel, in this part of the State, any like prodt have ever seen elsewhere, particularly in quality.

STOCK-RAISING.

Relying chiefly upon the wild grasses for hay and pasturage, we a present making good progress in this branch of agriculture. Stock, gene is allowed to roam on the prairies and in the timber, picking such food as pleases their taste, the result of which is good, wholesome beef, and the butter and cheese that such food produces. Diseased livers in animals r here are, I believe, unknown. As to the quality of the stock now seen, has been the most rapid improvement; in fact, Minnesota has some of the blooded animals that can be found in the western country.

WOOL.

Probably in no branch of stock-raising shall we be more proficient and cessful than in sheep. Our peculiarly dry and cold winters make our every way adapted to the business, and immense numbers, and of every l yet introduced into this country, are to be found here. There is every re to believe that in five years the clip of Minnesota will equal that of any State in the Union.

FRUITS.

A State that but fourteen years ago was inhabited wholly by Indians, out a single Protestant church, or a village containing two Yankee fam within its limits, cannot be expected to boast of noble orchards. They been planted, however, and though some have proved failures, others brought forth fruit, and two hundred bushels of apples is the estimated cr our State for 1863. Hundreds have given their opinion that this would n be a fruit-raising country; but when we take into consideration the fact the same opinion prevailed regarding the first attempts in all the nor States that now export fruit, we may well take courage from our present cess and persevere. Among our wild fruits we find apples, grapes, wild ries, haws, sand plums, gooseberries, thimbleberries, whortleberries, bluebe raspberries, black currants, checkerberries, blackberries, strawberries, and berries. Of wild plums we have some fifteen varieties that I am familiar and I learn that there are still more. The greater part of those I have eate of superior flavor. Certainly, if such a variety of fruit yields in abundance endures our extremes of heat and cold, why have we not good reason to be that we are in a fruit region? In the eastern and middle States I notice they are under the necessity of covering raspberries and grapes in winte venture to say that our wild raspberries, that never see covering, bear

of three months in the year, and during that period, at present, a distance of seventy miles. This river might, by means of s, be made an available steam canal for a distance of at least four and thus connected with Lake Superior, it would extend through e region of the northwest, and furnish all the power necessary nery that would be called for, and also furnishing any quantity ne irrigation of our soil. The tributaries of the upper river also le water-power, and are already occupied by the enterprise which layed by our first settlers. Timber and grist mills are found on while at the Falls of St. Anthony, water-wheels are turning machinery the business of our State requires; and I do not be- e exist in the United States greater inducements to the mechanical country than would be furnished by the improvement of this e suggested, and I believe the time is not far distant when that will be accomplished. The steps of progress now being taken, nterprise of our leading men, mark a future for our State that sanguine hardly dare anticipate. Every year has opened some wealth; and where we first sought our income from two saw- ndian trade, we now draw wealth, in part, from inexhaustible mines

April.—Ploughing and sowing grain is performed during this month.

May.—By the 15th of this month we usually get our corn planted, a unfrequently the mercury rises to 80° or even 90° Fahrenheit in the sha

June and July.—These are very hot, and vegetation makes rapid g especially in June; but in July the nights are cool, without, however, ishing the noonday heat.

August is the most agreeable of our summer months. During weather we have fine breezes daily, without which our summers would pressive. Generally we have a cold storm in this month, but very frost severe enough to injure anything.

September.—By the middle of this month we look for our first frost, however, touches us very gently.

October is a glorious month in Minnesota. About its commencen usually have a killing frost, after which we seldom have another for ten days.

November.—The air cools down, and we are ready for winter by the of the month. Ice usually forms in the river the latter part of the and occasionally we have a flurry of snow.

December gives us our first taste of winter, and the thermometer has a d downward tendency, until, in

January, it ranges about zero, though still oftener above than below January we usually have one week of severe cold, during which the me falls to thirty-five or forty degrees below zero. I have yet to see it there successive mornings, or remain at that point more than four hours after s

In *February* we have a cold "snap" for a few days also. In fact seen the thermometer at thirty-five degrees below zero at sunrise, and o'clock thirty-two degrees above, so that it may safely be said that extremes are attained in this latitude, but are only of a few hours' du We have generally a week each, in January and February, of excessive But our peculiarly dry atmosphere deprives our cold of the power of infl the suffering which is experienced in the eastern States, with the mercur at zero.

This review of *one year* will answer, as an average, for nine out of Minnesota. It seldom rains here from October to March. Our snows ar and it is seldom that more than six inches fall at one time. I have seen the snow over two feet on a level during a Minnesota winter. Gen we have from six weeks to two months of good sleighing, but for two past have had hardly six weeks each winter. During the summer mont have generally frequent rains, and exceedingly heavy dews. For the two years, however, there has not been, in this portion of the State, suf rain for vegetation, and last year our crops were nearly a total failure dry weather. Ten years ago we used to have the most terrific thunder-s but for several years past thunder and lightning are great rarities. We fine bracing air, pure water, and (unless previously ruined) a resident of nesota has a good constitution and a glorious appetite. Thousands of in resort here to regain health, and many succeed. Fever and ague do not nate here, neither are there any local miasmal affections. In fact, w recommend our State as very healthy.

POSTAL FACILITIES.

In no portion of the States are the people more highly favored by g ment in post office facilities than in Minnesota. The enterprise of ou settlers demanded frequent communication, and there is hardly a settleme half a dozen families that has not the most valuable of all public favo daily, tri-weekly, or weekly mail.

EDUCATION.

ibiting a natural trait of character, the pioneers of our Territory secured organic act a permanent appropriation for schools, whereby twelve hundred eighty acres of public lands are set aside in every township for school es. The fund now accumulating from sales of these lands begins to gigantic proportions, the result of which, if properly used, will be a liberal education to every child in the State. Independent of the n school fund is the State University, where we shall send our young o become ornaments to our noble State and the pride of the people. The ies are divided into school districts, and each of these has its well-built ol-house, where teachers are required by law to be employed at least three hs annually. Except in the more thinly settled districts, schools are tained both winter and summer. Our teachers are well qualified for their es, and hold the rank in society to which they are entitled. In connexion this subject I would mention the facilities enjoyed for religious worship. rly every denomination is represented in our State, and in most of the unities services are held every Sabbath. Our clergy rank with the first States, and the Sabbath is well observed in Minnesota. The church school-house go hand in hand with our progress, exerting those influences the rising generation which, impressed on the youthful minds, grow with growth, and secure for them in riper years honor and respect.

OUR POPULATION

rises the mixture usually found in all new States. Every sister State host of representatives here, and of foreign nations the Germans predate. These are always permanent in their locations, industrious and in their habits, quiet in disposition; they are encouraged more than e to turn our vast possessions into fertile farms. As far as I have had course with them, I have yet to meet the first man or woman who cannot ead and write their own language. There may not be many readers of the "Atlantic" and the "Continental," yet the intelligence of the people is above the ordinary standard of new States, and compares favorably even with the rural districts of New England.

HOMESTEAD LAW.

The benefits of this law are felt quite forcibly. Our lands are being secured by actual settlers, whose improvements are enhancing the wealth of the State—ite a contrast compared with the effects of locating land warrants. Under ew law every quarter section requires an actual settler to be upon it for ve yea in which time, if he is possessed of but ordinary enterprise, he can e] and worth at least five dollars per acre; while the law which allowed ients to patch up the country with land warrants, entailed upon some of our State a curse not yet removed. There are thousands of acres ld by non-residents that have never had a farthing expended upon them rovements, and their owners continue to pay taxes in the vain hope ne lands may yet rise in value, and then be sold to advantage. Fortu- the land warrants were located upon the most inferior portions of our and but very little of these portions can find cash customers at two acre until the government lands are all secured; and unless some inflation of real estate should occur, much of the land never will irst cost and taxes up to the present time.

tching the many pleasing features of our young State, I must not ion some of the serious drawbacks which we have had to contend of all were the

ARMY WORMS AND GRASSHOPPERS.

In August, 1855, our first great enemy made its appearance without any warning. First, as our oats were ready to harvest, the army worms c menced their ravages and made sad havoc in their path. Where they c from, or where they left off their labors, I never could ascertain. Their c was northerly. The next year we made the acquaintance of the grassh a more formidable enemy that came jumping down, taking a southerly dir This vast army ate everything before it. In the forest, saplings were by them, and all herbage seemed to be devoured indiscriminately. The on the prairies suffered more seriously than elsewhere, and, with the exce of pea vines, every crop was devoured. They laid their eggs in the gr and there was, to those unacquainted with their habits, a question as to w would come next, but the next year solved the question. The eggs hatc and where we had previously one full-grown grasshopper we now saw tw So numerous were they, in fact, that one could not walk without crushing t on the ground, while the air, as high as they could jump—some six feet—w alive with them. They turned neither to the right nor the left, but k straight forward course. If they came in contact with a house or other l ing, they would crawl up the side and over the roof, going down on the op side. If a window or door chanced to be open in their track, they ente and did not hesitate to feed upon anything they came in contact with—clot tobacco, shoes, even thick cowhide boots were ruined by them. We planted our crops as usual in the spring, and everything was eaten as soo it came up, so that on ploughed ground not even a weed was to be seen. Th depredations continued until the last of June, when they all rose on the w simultaneously, and in two hours after not a grasshopper was to be seen. heavy rain followed the next day, and we secured that fall a good crop of and potatoes. So vast was the number of these grasshoppers, that on departure there seemed to be a heavy cloud in the air which dimmed the of the sun, then shining brightly.

These were three years of no ordinary trials. During the fall of the grasshopper season (1857) the great financial panic came upon us with a c that weakened the faith of holders of corner lots and paper towns most ser ously. In our enterprise we had laid out towns all over the State, many o them not more than a mile apart, and thousands of us had reckoned on futur wealth. Wild lands, beautifully located, which had been purchased at $1 2 per acre in the winter of 1856, were surveyed and city plats were recor In 1857 the lots were sold to eager buyers at fifty dollars per lot, and not e a log cabin on the section. Some improved their purchases, but nearly purchased "on speculation." But the financial wave swept over our fai st and deluged the embryo cities, most of which, with their proprie.. carried so far out of monetary circles that they have not been heard of sinc Occasionally one passes, in travelling, the ruins of some deserted house, whic upon inquiry, proves to be a hotel of a town site which was mortgaged treble its real value in 1857, and "thereby hangs a tale."

The sensible and energetic men now showed of what they were compose They went to work with a good will to recover from their losses. Agricultur the great resort for the wealthy and retired citizen, also offers a good suppo to the bankrupt and destitute. Industry took the place of wild speculatic and town sites on unceded lands. Immigration poured in, and our young Sta was making great leaps for future prosperity, when suddenly there was a sou in our ears—the death-knell and savage war whoop of the

SIOUX DEPREDATIONS.

These, in 1862, spread terror in all parts of the State. In August of th year a trouble that had long been held in check reached its culminating poi

ges, presuming that our fighting population had been withdrawn southern rebellion, drew the knife and entered upon their fiendish pwards of one thousand men, women, and children in our frontier e brutally murdered, and several counties were depopulated, the ng for refuge to the cities and towns on the Mississippi. nonths trains of wagons passed daily, and the labor of years was y of being lost. The military resources of the State were put into this panic at last subsided. The next year the once powerful r State found themselves driven beyond the Missouri, and the rem- first band in the outbreak had taken refuge in the British posses- the line of which a sufficient cavalry force is now stationed, in com- officer who will not report many prisoners after a battle. Sufficient rce is now, and will hereafter be, stationed on our frontier to prevent er depredations from Indians, and settlers can now make homes in of our State with perfect safety. Our excitements and disasters have and the deserted farms are mostly repeopled.

THE DROUGHT

rear must not be overlooked, however. From October, 1862, until 4, 1863, we had but about twelve inches of snow and three inches of result of which (being confined to the northern section of our State cut off our grain crops on many farms. Fortunately, work being pushed Pacific railroad, the labor required furnished aid to many, and a very nter following, much suffering was prevented. With a judicious ex- re of money by our State, and perhaps a small appropriation in aid of erprise by Congress, the

IRRIGATION

ge portion of this section of the State may be effected to prevent droughts er, as well as bring a good return to the State treasury, and an increase s to the farmers who will take advantage of the enterprise. It will thus that most of our drawbacks can be avoided in the future; but I have ned them to show that we have had a good share of trials, and yet are ouraged.

SCENERY.

ng the attractions of our State may be mentioned the beauty of our lakes, and waterfalls. Many of our lakes are miles in extent, and stocked erel, bass, and other fresh-water fish, and the delightful scenery on s cannot be surpassed in romantic beauty. As a resort in the summer oy the wealthy and pleasure-seekers, Minnesota is fast coming into no- In connexion with natural attractions, I may mention that our wild both in the woods and on the prairies, claim great attention from bota- their almost endless variety. Many of them are peculiar to this latitude.

WILD GAME.

long residence of the Indians has been the means of destroying most of ious animals, and it is but occasionally that even a bear commits any . The remnants of beaver dams indicate that these valuable and animals were once plenty, but they are not found, as far as my ge extends, by our white trappers. Fishers, otters, minks, and musk- plenty on the outskirts of civilization, and are at present quite a source but the present high prices of furs must soon cause them to be ex- Of deer, rabbits, and wild fowls we have an abundance, and the of the State are well respected. Wild geese, brant, ducks, par

tridges, grouse, and pigeons are plenty; quails are occasionally seen, but t
turkeys are not as yet residents here. Of depredators, we have plenty of
squirrels, and gophers, (pouch rats,) but the common house rat has not got
yet, beyond the large towns; at least the farmers above the falls do not rej
their presence.

WILD RICE.

We have in the northern part of the State a great abundance of this a
which is much valued by the Indians as an article of food, and, when well
pared, is a palatable dish. In my vicinity, though quite plenty eight y
ago in the lakes and rivers, it has disappeared, as well as the cranber
some of the swamps. There are, however, in the State thousands of ac
both rice and cranberries.

SWAMP LANDS.

In a country whose surface is so completely dotted with lakes, there
course, a great quantity of swamp lands. From these a great deal of h
annually harvested, and they are relied upon by nine-tenths of the popul
for all their hay. Annual cuttings, however, are causing them to run o
their productions, and the cultivation of tame grass must soon be resorted
the old-settled parts of the State. The great majority of these swamps c
easily drained, and where they have been so treated, ploughed, and grass
sown, immense crops of hay repay the labor expended. Timothy and c
yield well upon our prairie soil where the precaution is first taken to exte
nate the gopher, which is easily done by putting a crystal of strychnine in
small potato, and dropping one in every hole where their presence is indic
An investment of seventy-five cents in this poison, last spring, enabled me
exterminate them from five acres.

Having glanced at nearly all the items that will naturally interest a pe
seeking a home in a new country, I will now refer to other matters of gen
interest.

CITIES AND TOWNS.

The largest city is St. Paul, the capital of the State, with a population
twelve thousand inhabitants; but there are numerous other points which
though outnumbered in population at the present, are increasing rapidly, a
some of them will eventually surpass it. Manufacturing interests, aided by
railroad facilities now being furnished, will bring other towns into promi
notice.

NATURAL RESOURCES OF WEALTH.

Having already mentioned the fertility of the soil for agricultural pursuits,
also our vast forests of choice wood for all useful purposes, and our immen
water-power, I come next to our recently discovered coal deposits. On
Big Cottonwood river, a tributary of the Minnesota, a shaft has been sunk, re-
vealing a vein of coal over five feet in thickness. This deposit is found in
place, and from the best geological opinion it is believed to extend through
the entire western part of the State northward, and again crops out in Dakota
Territory, at Lake Jessie. Heretofore our coal for gas and manufacturing pur-
poses has been imported from other States. Our coal is of superior quality—
bituminous.

COPPER.

Our vast deposits on Lake Superior are inexhaustible, and their extent and
quality of ore are too well known to need more than a passing notice.

In the same vicinity immense veins of other valuable metals are reported to
exist, consisting of

IRON AND LEAD.

geological survey of this great mineral district has just been ordered by State legislature, the result of which will soon be made known to the public authentic form, all of which will add greatly to the wealth of our young e, and tend to place Minnesota in the first rank for agricultural, manufac- and mineral wealth.

ly has eastern capital sought investment here, and, in consequence,

RAILROADS

rapidly being built. As these great agents of commerce and civilization no longer imaginary, and as we now see the iron being laid, it may not be of place to notice such as are realities. The St. Paul and Pacific road, h its branches, contemplates a railway from Winona to St. Paul, along the st bank of the Mississippi to Hastings, where it will cross the river, thence the east shore to St. Paul, a distance of one hundred miles. This, with con-xions in Wisconsin, will place St. Paul about three hundred and seventy les from Chicago; (our old stage route was estimated as three hundred and ty miles from Galena.) It will then extend from St. Paul to St. Cloud, ence to Ottertail lake and Pembina, with a projection on through the British ssessions, by the Saskatchewan river, to the Pacific ocean. Thirty miles of is road is already finished and cars running; eighty more will be completed present season, and English capitalists have invested in the enterprise to n an amount as to show a certainty of an early completion of the entire line. s is the great national enterprise, in which the whole northwest feels a deep est.

rom Stillwater, on the St. Croix, to St. Paul, and from thence to Minne- s and westward to the foot of Big Stone lake, the main line of this com- y, with its magnificent congressional grant, points to the gold fields of alio.

From Minneapolis and St. Paul the Cedar Valley road runs in a southerly lirection through Northfield, Farribault, Owatoma, and Austin, to the southern imits of the State, where it makes connexion with the Prairie du Chien and lwaukee road.

From St. Paul there is a congressional land grant road, graded for fifty miles up the valley of the Minnesota river to where it turns in a southerly direction, and connects with the Union Pacific at Sioux City. From Winona there is the Winona and St. Peter's road, with thirty miles completed and cars running. It is contemplated to extend it to the western line of the State. The Root River Valley road, also a congressional land grant road, extends from La Cres- t, via Chatfield, to Rochester, where it connects with the above road. These are of vital interest, and no idle schemes, and show the enterprise of our State. I must not omit the proposed road to Lake Superior. From n, Wisconsin, sixteen miles from St. Paul, a road is now being built to r, with a branch to Bayfield. Forty miles will be completed this sum- Our road from St. Paul to Stillwater will connect us with the route, and the much desired outlet to the great mining regions.

writer has sketched roughly a picture of Minnesota as he sees it now. e here the first week of its birth as a Territory, and has continued until nt time, noting the changes in its growth. The bulk of the population sisted of Indians—Sioux, Chippewas, and Winnebagoes. The streets ittle settlements were alive with the aborigines, and our merchants were traders. The whole of the territory on the west side of the Mississippi ccupied solely by the Indians, with an occasional licensed trader. That was forbidden ground to any white man, but could not long remain

so. The rush of immigrants soon made it evident that more room for enterp
was needed. A treaty was made and ratified with the Sioux in 1851, and th
whole country west, upwards of one hundred miles, and extending fr
Chippewa lands (whose southern limit was at Fort Ripley) to the Iowa
was at once opened to white settlements, and a law of Congress made it l
for settlers to go into unsurveyed lands. Minnesota now presented a
aspect. The spirit of adventure of the old settlers induced many of t
make voyages of discovery by land and water; every available point
once selected and staked out for a future city, while the new immigrants
their attention to securing one hundred and sixty acres each for a future
The Sioux depredations have caused a large portion of the nation to
themselves from their reservations, and the whole country now between the
sippi and Missouri rivers, lies open to the white man; and should this
of a great portion of which we have but slight knowledge, be as rapidly pe
in proportion as the principal part of our State has been, ten years hence
undoubtedly reveal a store of wealth, both mineral and agricultural, t
cause a greater excitement in immigration than has ever yet been known
country. The Sioux Indians will never be allowed to re-occupy this
They must go further west. Nothing can impede the progress of the
man. The question is often asked, what must eventually become of the
of Indians in the northwest, and many conjectures have been made in
to the subject.

Philanthropists argue that our government does not treat the Indians
manity dictates, and many noble and good men are endeavoring to de
way by which to clear us from the sin of totally exterminating them. It
evident they cannot remain in their present condition as savages, and yet co
in contact with the whites. The pioneers of civilization are not usually
least of the present day) men of pure and spotless characters, nor have
efforts thus far made by missionaries among the Indians met with suffi
success to induce us to believe they can be converted to Christianity, and
to adopt the customs and habits of civilization.

In connexion with this digression from my subject I may be allowed to m
tion a tradition which prevails among the Sioux, that they came originally fro
the southwest, and occupied the entire country until they reached the limits o
the great lakes in the northeast; there they tarried for a length of ti
gradually moved back to the great river and towards the northwest; u
they were, by means not given, still gradually to move on, and eventually be
come extinct.

But to return to our subject. Cities, towns, and villages have sprung
existence as if by magic; the iron bands are linking us with the great cen
of trade; the Indian trails are obliterated, and the powerful locomotive,
its long train of cars, goes thundering by us, while the telegraph wires stret
over our heads flash thoughts as soon as conceived. It seems more a dr
than reality. This may be a rather glowing and vivid sketch of so young
State, yet the statements are none the less true. Nowhere in the United Sta
can there be found a purer and more healthy atmosphere, so free from ca
of disease, and so invigorating to the human system. The laboring man
woman can here secure for himself a home and a farm of one hundred and sixt
acres, and pay for it with his own hands. The homestead law gives him th
land for about ten dollars in money, and a bare residence upon the land for fiv
years secures him a clear title; or if he desires a home near old settled place
the railroad company will sell at reasonable rates from their land grants, an
give ten years' time for payment. No large capital or heavy outlay is require
since with industry, sobriety, and a careful economy, (the foundation of wealt
and happiness in all climes,) every man, however humble, can here become in
dependent. When one thinks of the thousands of poor who are crowded i

dent wholly upon uncertain rewards for their daily toil, often
ie necessity of asking aid from charitable societies, and then look
llions of acres of vacant land waiting for the hand of persevering
take them as a gift, it makes one wish for the means to bring them
esota. Many are the families living in poverty that have no knowl-
s fair land; or if they have, no means to reach it. Where they are,
n abject poverty and sickness, while here in a few years they might
lth and have a competence. Let some way be devised to bring a
e of the homestead law to the notice of the poorer classes in our cities,
benefit those within our own country, as well as to spend thousands of
spread the glad tidings in foreign lands. Let the officers of the chari-
ieties in every city, particularly in the east, be made familiar with the
, instead of dealing out bread and soup, with a meagre supply of
, let them aid the worthy poor to reach our State, and thereby save
; and inexperienced within the snares of city life from lives of degra-
The people of the west are generous, and willing hands are always
) give aid to honest want. Information has just reached us of the rati-
of the treaty between the Pembina and Red Lake Chippewas, which
to us the whole American valley of the Red River of the North, opening
field for the immigrant, and presenting great inducements from its
. It also gives us access to further exhaustless treasure that must not
looked in this sketch, which consists of the

SALT LAKES.

ie northwest portion of our State, extending over an immense area of
r, including Devil's lake, the country is filled with salt lakes and
. Many of these lakes are of great extent, and the time is not far distant
lt will be exported by rail from this section of country to supply all the
t bordering on the Mississippi river. Devil's lake, as well as some
ones, are well stocked with fish of excellent quality. The salt in its
te is said to be of excellent quality, and is reported as abundant.

A BUREAU OF IMMIGRATION

n established by the State of Minnesota, at the head of which is Hon.
Blakely, secretary of state. Farm lands are in great request, and the
swarming with people seeking eligible locations. The same state of
exists in other northwestern States, and the indications are that heavy
ion, from the north of Europe particularly, will continue increasingly to
ie population of this region. The northmen of Europe are particularly
by a climate which combines a bracing, salubrious, clear, and uniform
ıu e with summers so long and hot as to produce to perfection all
ts of the temperate zone; by the agreeable variety of surface and
mingled forest and prairie, and numerous rivers, lakes, and islands to
y the scene.
immigration will be facilitated by an act of national legislation ap-
July 4, 1864, which is given at length in another portion of this volume.

WEST VIRGINIA.

BY J. R. DODGE, DEPARTMENT OF AGRICULTURE.

THE "Old Dominion" of our fathers, eldest in the family of States, fairest in all that constitutes the highest natural attractions of the sisterho has committed the *hari kari*, or "happy despatch," under the influence of demon of secession—is disembowelled and rent in twain. But she is im and while East Virginia yet writhes in penitential agony, West Virginia only lives, but is beginning to put forth a hitherto unknown vigor, and proms a career of glory and benefaction, a full maturity of beauty and pride, and name of honor among the most illustrious of States in all coming time.

The new State has had her birth in the era of revolution, and has been bap tised in blood, in the name of law and liberty; yet her most ardent aspirati is for a peace unsullied by cowardice or injustice—for an honorable dive from the "war-path" to the path of progress in the arts of industry—for higher and purer life, that shall animate and elevate every human being witl her borders, and bless, with prosperity, education, refinement, and reli myriads of happy homes.

Other States may boast of broad savannahs that bask in placid beauty, a soils of interminable depth and richness. West Virginia acknowledges rough exterior, but claims for her hills the adornment of majestic and comely forest growths; for her vales a permeable and fruitful soil; for her rivers a wealth of water power; for her mines a heritage illimitable, and for her broad domain the insignia of strength, enduring vitality, and sturdy independence— the proud characteristics of her people.

LOCATION.

A more central and accessible location could scarcely be pointed out upon the map of the United States; not central in a continental sense, but eminently so as regards the Atlantic seaboard and the area almost encircled by the lakes, the upper Mississippi and Ohio rivers; central as regards the populous cities, the markets of the country. Harper's Ferry, on the extreme east, is but 81 miles from Baltimore, 112 from Washington, 179 from Philadelphia, and 286 from New York. Wheeling, on the northwestern border, is but 137 miles from Cleveland, and 491 from Chicago. Parkersburg, the terminus on the northwestern Virginia branch of the Baltimore and Ohio railroad, is 383 miles from Baltimore, 568 from New York, 522 from St. Louis, 544 from Nashville, and 200 from Cincinnati. It is connected with the tide-water of the Atlantic coast by railroad, 81 miles distant. The water communication by the bays and rivers of Maryland and Virginia is neither appreciated nor improved as it will be in the future, having some of the deepest and largest harbors on the continent. The shore-line of Virginia alone is made 1,571 miles by the Coast Survey. The western border of West Virginia lies 300 miles on the Ohio river, and is in immediate communication by water with the whole Mississippi Valley, permitting the exchange of products with the Louisiana planter at his doors; admitting of traffic along the banks of the Missouri in the wilds of Dakota, and allowing side-wheel steamers from the Kanawha to vex the waters of the far-off tributaries of the upper Mississippi.

ghs and automaton harvesters, which will hereafter garner the an-
of western prairies, may be transported to all those plains in vessels
by the labor of West Virginia from her own oak and iron, and the
hose implements may there be mined, the ore heated by adjacent
al, the requisite flux obtained from the same hill, and all compacted
ect machine, with timber found growing on the surface, which has
ufactured by a perpetual water-power that leaps the crags of the
d falls gently into the vale below, meandering towards the Ohio,
he meditative ox that fattens on the sweetest of perennial herbage
anks.

in the wide world, lies so broad a network of water communication
ry feet of a State so full of the varied treasures of the forest and of
That such a country, with an elevation above the malarias of the
and never rising above the level of corn and sorghum production;
few hours of the sea and its treasures and facilities for transit—a land
for its green pastures flowing with milk, for its bright flowers laden
ey, and for its river slopes that promise to run with wine—should lack
ats, or the hum of industry, or the show of wealth, is an absurdity of
ent and an impossibility of the future.

POPULATION.

ments began to extend across the mountains immediately after the close
evolutionary war. Localities in Greenbrier and Berkeley, and other
, were settled before its close. Virginia, in 1781, had already a popu-
f 567,614—almost double the present population of West Virginia. It
idly increasing, doubling its population in twenty-seven years, this rate
ase having long existed with great regularity. Jefferson, assuming the
tio of advance, predicted the attainment of a population of 4,540,912
. This he regarded as a "competent population," which would be
e square mile, and less than the present population of Massachusetts,
Island, Connecticut, New York, and New Jersey, and equal to that of
nd. In 1790 the population was 748,318, verifying Jefferson's calcu-
In 1808 it should have been 1,135,228; it was actually but 1,065,129
, and in 1860 it was 1,596,118, little more than one-third of Jefferson's
d population.

calculation was by no means unreasonable. If Virginia had continued
e most densely populated State in the Union, its population would, in
ave been 9,683,186. Nor is it due to superior natural resources that a
ven other States have a denser population than Jefferson expected for
ve State, for Virginia exceeds them all in natural wealth, and stands
equality with the most favored in point of climate.

fair, then, to ask, why has not West Virginia been peopled? When
census was taken, there were found 389,809 inhabitants of other States
Virginia. How many, in the past, had died away from their native
d how many children of these and of living Virginians are now aiding to
he population of other States, cannot be known; were it exhibited, it
show the prediction of Jefferson to be an approach either to prophetic
y or exact mathematical calculation. It may be said with some truth
superior facility for getting prairie lands into cultivation in regions
west has drawn emigrants over the summits and down the western slopes
Alleghanies. The swinging of the woodman's axe and the climbing of
ay have been distasteful; and the deep river bottoms and broad alluvial
may have had their attractions, despite the discomfort of chills and fever
annoyance of mud and mosquitoes.

A second reason may truthfully be given in the evident fact that this is peculiarly adapted to special enterprises, both mineral and agricultu volving either capital or association, or both, such as coal mining, iron w salt-making, oil-working, wine-making, fruit-growing, dairying, and shee bandry; and hence its development has been retarded.

But the most potent cause of delayed development, after all, as a ma fact which cannot be ignored or refuted, is the instinctive feeling in all ur diced minds that free labor is more profitable and honorable to all living its product than servile, yielding more comely social results and sweeter fruits; that it is more conducive to the general health and happiness, and productive of mental culture and general intelligence; and hence that its ciations and consequences, in the distant future, are infinitely more de surroundings to that posterity for which it is the business of life to provi

Nor are Virginians, upon this point, practically unbelieving. Whate prejudice, so naturally begotten, inbred and instilled by habit and edu may have swayed them, the suggestive fact remains that more of them sought homes in the free than in the slave States. In opposition to the erful control of habit and early association and inculcation, and oftimes in apparent violence to expressed opinions, humanity and self-preservatio instinctively asserted their power, as will be seen by the following which designate the States in which persons born in Virginia were in 1860:

SLAVE.		FREE.	
Alabama	7,598	California	
Arkansas	6,484	Connecticut	
Delaware	171	Illinois	
Florida	654	Indiana	
Georgia	5,275	Iowa	
Kentucky	45,310	Kansas	
Louisiana	2,986	Maine	
Maryland	7,560	Massachusetts	
Mississippi	6,897	Michigan	
Missouri	53,957	Minnesota	
North Carolina	9,899	New Hampshire	
South Carolina	1,117	New Jersey	
Tennessee	36,647	New York	
Texas	9,081	Ohio	
		Oregon	
		Pennsylvania	
		Rhode Island	
		Vermont	
		Wisconsin	
Total	193,086	Total	1

This emigration would naturally be to Kentucky and Missouri. States include 99,267 persons from Virginia; and Ohio, Indiana, Illin Iowa, extending precisely the same distance west, contain, almost exclu in their southern portion, 163,644 of this population.

tion of the counties comprising West Virginia by the census of 1860.

	Free.	Slave.	Total.	Counties.	Free.	Slave.	Total.
	8,863	95	8,958	Monroe	9,643	4,114	10,757
	10,875	1,650	12,525	Morgan	3,638	94	3,732
	4,682	158	4,840	McDowell	1,535	.....	1,535
	4,888	104	4,992	Nicholas	4,473	154	4,627
	5,476	18	5,494	Ohio	22,322	100	22,422
	7,715	305	8,020	Pendleton	5,920	244	6,164
	2,493	9	2,502	Pocahontas	3,706	252	3,958
	1,766	21	1,787	Preston	13,245	67	13,312
	5,169	34	5,203	Putnam	5,721	580	6,301
	5,726	271	5,997	Pleasants	2,930	15	2,945
	3,707	52	3,759	Raleigh	3,310	57	3,367
	10,686	1,525	12,211	Randolph	4,807	183	4,990
	12,700	1,213	13,913	Ritchie	6,809	38	6,847
	4,443	2	4,445	Roane	5,309	72	5,381
	8,791	1,073	9,864	Taylor	7,351	112	7,463
	13,208	582	13,790	Tucker	1,408	20	1,428
	8,251	55	8,306	Tyler	6,499	18	6,517
	10,575	3,960	14,535	Upshur	7,080	212	7,292
	13,966	2,184	16,150	Wayne	6,604	143	6,747
	7,769	230	7,999	Webster	1,552	3	1,555
	4,790	148	4,938	Wetzel	6,693	10	6,703
	12,659	63	12,722	Wirt	3,728	23	3,751
	12,968	29	12,997	Wood	10,870	176	11,046
	8,797	376	9,173	Wyoming	2,797	64	2,861
	6,457	362	6,819				
	12,947	101	13,048		358,317	18,371	376,688

EDUCATION AND PROGRESS.

people of West Virginia are departing from the wisdom of the fathers
e y days, when Sir William Berkeley, the proprietor of a large tract
ndoah valley, eighty years ago, wrote of the new country as follows:
: God there are no free schools nor printing, and I hope we shall
these hundred years, for learning has brought disobedience and heresy
into the world, and printing has divulged them and libels against the
rnment. God keep us from both." But this departure leads in the
of a superior wisdom, and a school system has been adopted since the
on of the State, modelled upon the best State systems in the country,
s of which will soon be manifested in general educational improvement.
of a higher grade are beginning to be organized—academies and high
seminaries, for young ladies—and the impetus already given to
progress in mental culture will soon occasion a further demand for
educational facilities.

wakened throughout the State a spirit of lively interest in the con-
roads and the improvement of river navigation, in new enterprises
its varied resources, in all measures essential to its security, and the
and thrift of its people, and to their mental and moral advancement.
ing of relief from an irksome and heavy burden in separation
whose malign influence has long rested like a nightmare upon
system of taxation was unequal, discriminating against the
section, taxing lightly those interests which the west did not
re internal improvements, adding greatly to local property
ertaken in the east. Railroads, of greatest feasibility and
l brought into notice by public-spirited individuals, were
killed by the same determination to override the interests

STATE OF IMPROVEMENT.

The farm lands embrace at least four-fifths of the area, amount 10,896,394 acres, or 17,025 square miles, and they average a value of per acre. The State of Virginia, before division, comprised 31,014,95(in farm lands, worth $11 91 per acre. In view of their central lo(cess to eastern markets, and connexion with all parts of the Mi by river navigation, munificence of forest and field, and gr er we. minerals beneath, this is cheaper than any lands of similar position and in the country. With a little improvement in each county, of a charact shall be an earnest and guarantee of progressive and steady advancement terial development, eight dollars per acre will become twenty, and eighty millions in the aggregate will become more than two hundred millions. such improvements will nearly pay for themselves as they are made, l fully one hundred millions of dollars, in a very few years, to burden the p of the people who have the industry and patience to make them.

The population of West Virginia is, by the last census, 376,688. I stands the twenty-seventh State in the order of its population, with eight it, namely: New Hampshire, Vermont, Rhode Island, Minnesota, Florida, ware, Kansas, and Oregon.

New Hampshire, the next below in point of numbers of its inhabitant tains 35 to each square mile. West Virginia has 16, as nearly as can l culated in the imperfect condition of her surveys. To realize more ful present material status of this new member of the family of States, let parison be instituted with this older member of the family. It will be useful, in the future, in illustration of the growth of a region blessed wit vellous resources, when relieved of the incubus of dwarfing and degrading and fairly started in the race of improvement.

	New Hampshire.	West Vi
Population	326,073	
Acres of improved land	2,367,039	2,
Acres of unimproved land	1,377,591	8,
Cash value of farms	$69,689,761	$87,
Average value of lands per acre	$18 58	
Value of farming implements and machinery	$2,682,412	$1,
Horses and mules	41,111	
Cattle	264,067	
Sheep	310,534	
Swine	51,935	
Value of live stock	$10,924,627	$12,
Wool, pounds of	1,160,212	1,
Potatoes, bushels of	4,137,543	
Barley, bushels of	121,103	
Buckwheat, bushels of	89,996	
Wheat, bushels of	238,966	2,
Rye, bushels of	128,248	
Indian corn, bushels of	1,414,628	7,
Oats, bushels of	1,329,213	1,
Orchard products, value of	$557,934	$
Market-garden products, value of	$76,256	
Butter, pounds of	6,956,764	4,
Cheese, pounds of	2,232,092	
Hay, tons of	642,741	
Home manufactures, value of	$251,013	
Animals slaughtered, value of	$3,787,500	

gh the area of the Granite State is but forty per cent. of that of West nia, the improved land is equal in extent, while the unimproved farm lands e than one-seventh as extensive; yet the average cash value in so generally improved is but $18 58 per acre, against $10 03 per ate which has but one-fifth of its land under improvement. New s, of live stock, fewer horses and mules, cows and young cattle, e, but more working oxen. Her excess of working oxen, of n cows and young cattle, in part offsets the superior numbers or West Virginia, so that the proximity of the White mountains rkets of manufacturing cities, and the famed Cambridge market, really little superior in position to the western slope of the Alleghanies, so e to Cincinnati and Louisville on one side, and Baltimore and Wash- the other. New Hampshire has the advantage of quite fifty per cent. e of animals slaughtered, but West Virginia can offset something in s of horses. With a smaller number of animals to feed, more than four s much hay is used by New Hampshire farmers; and it is not altogether to the consumption of a greater amount of corn in feeding stock that so nay is used by West Virginia farmers, but it is due to the comparatively l mild winters, and the abundance of excellent pasturage. This fact greatly to the comparative profit of stock-keeping in the new State, and ventually add to the market value of her broad acres.

The bushels of corn and wheat, and other grain, plainly point to the fertility oil, having been produced by imperfect and slovenly culture, the blemish ace of southern, western, and, in fact, American farm husbandry.

The item of a half million dollars of home manufactures is creditable to the f rural simplicity and to the self-reliance of the women of West Virginia. o show this to be a low estimate of profits to be derived from enhanced let the valuation be placed on the basis of that of adjoining States— lvania and Ohio. In intrinsic wealth of soil and minerals combined, from the accidents of settlement or position, West Virginia can scarcely l to be inferior to either. The present farm valuation is $87,525,087. At Ohio valuation, $32 13 per acre, it would amount to $350,101,139; at Pennsylvania valuation, $38 91, it would be $423,978,690. The impetus o improvement by inaugurating the policy of voluntary labor, with all endencies to material and moral development, is sufficient to give instantly ndred millions of dollars additional value to the farming lands of the and when the war is over this enhancement will at once be seen in im- nt in prices.

FOREST LANDS.

following statement of a correspondent, C. S. Richardson, of Briar- nes, in the Kanawha valley, illustrates the character of the virgin

paratively unknown, and seemingly uncared for, there are extensive tracts of rich lands in the wilderness, whose capability of productiveness, when developed, would ase dwellers in the open country if they were made acquainted with the facts. Iso- n general view through the absence of any roads, the traveller has but little chance r their acquaintance. The dwellers in these solitudes are not of a very communi- position; hence so little is known of their real value. During a series of topo- and geological surveys on the Elk and Coal rivers, my attention was drawn to spots that I conceived would make beautiful farms. Gentle slopes, flat-top ridges, dells were frequently met with. These were primitive forests, and a stranger to the 's axe or the saw of the lumberman. Being interested in the mineral resources of having in view one of its fundamental principles of development—population— o try an experiment to ascertain the truth or fallacy of my ideas. With this I selected a spot scarcely ever trodden by the foot of man. It is called ,' and lies between the main Briar creek (Coal river) and the Davis creek ha. As an inducement to my first pioneer tenant, I offered to let him have rent free, for five years, and after he had got his log house burnt, fields

enclosed, and a road cut for a way out, he should have a lease for twenty-one year dollars a year rent. I soon found a tenant, and thus far I can report the experi nently successful. It has been two years in cultivation. The first year was chief to clearing, or rather girdling the trees, fencing, breaking up the ground, and bu house and barn; but, nevertheless, several acres were cultivated, and yielded a ver of corn. Last year, the ground being tolerably well cleared of roots and u the trial commenced. The summer was unusually dry; scarcely any rain fell months; but the soil being new, and a humid atmosphere, which always prevails i woods, keeping the heated air cool, the crops grew vigorously; and when the har my tenant had the pleasing satisfaction of being able to report he possessed the *fin corn in the district.* Even on our bottom lands there was nothing superior.

"I have since visited another spot, although not quite so isolated, where simil were obtained. This small trial shows very conclusively that if immigration is j encouraged, and land-owners induced to be more liberal in their concessions to the l laboring classes, thousands of acres of our back forest lands may be brought into a state of cultivation, thus creating a new field to agricultural enterprise, increasing lation, reducing our taxation by distributing its burden over a greater number of co and materially augmenting our nation's wealth, prosperity, and greatness. Ma will be inclined to remark: 'This is all very well in theory, but in practice wil Now let us see. These lands, on an average, can be purchased for less than $ Fifty acres, then, cost $200. Add five years' interest on this before any rent is recei is $60, and $40 for miscellaneous expenses, making $300. The rent on this, at $ (which is about half of what is usually asked,) produces ten per cent. Now the speak of are mineral lands, and as soon as the country is intersected with railwa we all hope it soon will be,) then every acre in proximity to such lines will be wort to $100."

CLIMATE.

A study of the causes affecting the climatic condition of West Virg be found interesting. In its latitude, lying as it does mainly between 40° north, it is neither suggestive of hyperborean blasts in winter, or temperature in summer, of pent-up valleys, blockaded with drifted s solid ice for weary months, or sweltering plains, parching and baking brazen sky. It has neither the saturated and leaky canopy that overh England, or the rainless sky of a California summer, but a pleasant giving a covering of snow in winter just sufficient to protect the grass a a rainfall in seed-time ample for the proper preparation of the soil, and ished supply in gentle showers during the later growth and ripening tation. Its mountains, unlike those of Europe, or the Rocky mountai west, do not very materially affect the conditions of climate, exce duce the temperature in proportion to altitude. There are local differ be sure, the result of peculiar position, but the interior valleys of the All have nearly the same temperature as the broad slopes on either side, a opposite slopes scarcely differ in their climatic peculiarities. Unlike t tains of Europe, however, the Alleghanies in this latitude have less r the plains below.

ALTITUDE.

The average altitude of the highest summits is 2,500 feet in this s the Alleghany range, increasing southward. The upper valley of the K instead of being an arid desert like the Colorado and other elevated pl luxuriant in verdure, differing comparatively little in humidity and ten from the Atlantic coast and the Ohio valley in the same latitudes; in elevation of the Kanawha is but 2,500 feet in southern Virginia near it descending more than one hundred miles before it bursts its Alleghanis in Monroe county, West Virginia, where it ranges between 1,800 a feet, thence rapidly falling to little more than 600 feet at the foot of near the mouth of the Gauley, whence it flows gently, with the sligh of a few inches to the mile, to the Ohio river. The following table ex elevation of the Alleghanies and their slopes in this section of that g tain range:

Summit elevations.

37½°	2,650 feet.
of Baltimore and Ohio railroad	2,620 feet.
White Sulphur springs	2,000 feet.
and Greenbrier rivers	2,400 feet.
Harper's Ferry	1,800 feet.

Elevation of the valley of Virginia.

Potomac	800 feet
gton	902 feet
ton	1,222 feet

Elevations west of the mountains.

rer, valleys of western declivity	1,375 feet
the Greenbrier	1,333 feet.
valley, lowest within the mountains	1,000 feet.
er at Pennsylvania line	675 feet.
er at Kentucky line	550 feet
river at Charleston	600 feet.

irst of these divisions, the summit and table-lands of the Alleghanies s a narrow strip little more than the average width of a county, and from the Alleghanian backbone to the chain of mountains which are continuation of the Cumberland range, and known as Cotton Hill, Laurel Hill, &c. The valley between these two ranges lies at a level to 2,000 feet above the sea; the Greenbrier valley, for instance, for a f 150 miles, having an average elevation of 1,500 feet. Much of the land of Greenbrier county, which is one of the summit counties, lies t of 1,800 to 2,000 feet, and yet ripens corn and sorghum without , and enjoys a winter climate of great mildness.

second division includes the valley of Virginia or the Shenandoah averaging, perhaps, fifty miles in width, and extending through State of Virginia in a southwestern and northeastern direction. Only th of the valley is embraced in West Virginia. Its average elevation on is, perhaps, 1,000 feet.

rd section, which may be said practically to represent the elevation te, containing at least 16,000 square miles, or two-thirds of its entire luding and almost bounding on the east the great coal basin, lies between ides of 600 and 1,500 feet. The uplands, a few miles from the Ohio, elevation differing considerably at different points, may be averaged at In the Kanawha valley, below the falls, the river is little more ele- the Ohio from Parkersburg to Point Pleasant, but the river bluffs rise y, giving the surrounding country an average of at least 1,000 feet s, with a considerable increase towards the falls. The average re section is, perhaps, 1,100 feet. By a comparison with other sippi valley, this elevation will not be found to indicate a y mountainous in its altitude:

it (highest land in Ohio)	1,400 feet.
	1,131 feet.
, (Ohio river)	540 feet.
	762 feet
ces of Maumee	850 feet
l Wisconsin	950 feet.
n Wisconsin	1,640 feet

Chicago, Illinois	[illegible]
Central Kentucky	800
Louisville, Kentucky	441
St. Louis, Missouri (Upper)	4
Knoxville, Tennessee	[illegible]
Chattanooga, Tennessee	643
Huntsville, Alabama	6

Thus the greater portion of West Virginia, though appearing so mount from the broken character of the surface, is of less elevation than Logan Hardin counties, in Ohio, which are so level in districts of highest elevation to present the appearance of swamps, and suggest to the agriculturist the ne sity of surface drainage, while the ascent has appeared like a continuous from the Ohio river.

The slope of the Alleghanies on the west is more abrupt than on the east, making a rapid descent for the rivers for a short distance, whence their flow is gentle, with grades not unlike those of rivers upon the eastern side of the Ohio, the only essential difference being the greater rapidity of the Alleghanian streams near their sources.

TEMPERATURE.

The mean temperature of West Virginia, for the year, as may be seen by an examination of the isothermal lines, is lower than any other locality in the same latitude east of the Missouri river. It lies between the lines of 50° and 54°, which embrace the southern and central portions of Ohio, Indiana, and Illinois, with contiguous portions of Missouri and Iowa; on the Atlantic, deflecting northward to include the coast line between New York and Baltimore. The isothermal, indicating a mean temperature of 55°, passes through Baltimore and Washington, circles round the southern boundary of West Virginia, intersects the northern border of Kentucky, and strikes St. Louis, leaving Philadelphia and Cincinnati a very little north of the line. The line of 52° would come very near the centre of West Virginia. This would make the average temperature slightly lower than that of those two cities. The following table, prepared from the Smithsonian record, shows the highest, lowest, and mean temperatures for each month of 1859, of Philadelphia and Cincinnati, with two points on the Kanawha, one near the top of the Alleghany range, the other nearly on a level with the Ohio river.

Month.	Kanawha county, West Virginia.			Lewisburg, West Virginia.			Philadelphia, Penn'a.			Cincinnati, Ohio.		
	Highest deg.	Lowest deg.	Mean temperature.	Highest deg.	Lowest deg.	Mean temperature.	Highest deg.	Lowest deg.	Mean temperature.	Highest deg.	Lowest deg.	Mean temperature.
January	62	6	35.14	62	-2	32.55	54	....	30.79	60	7	36.1
February	66	18	41.69	64	13	38.40	62	20	36.44	68	14	40.3
March	75	30	51.58	72	30	47.68	70	22	48.12	70	31	50.1
April	80	31	53.98	85	25	51.96	78	33	50.28	78	31	52.3
May	86	48	65.62	82	48	68.03	85	48	64.65	86	54	70.0
June	91	42	68.51	90	38	69.93	95	49	70.65	98	52	72.8
July	95	57	74.67	92	50	75.93	95	58	76.00	100	56	79.5
August	92	52	73.38	92	60	74.33	95	55	74.53	94	54	75.
September	84	50	65.93	79	34	61.29	81	48	66.18	86	56	68.
October	80	25	50.99	69	20	48.35	80	32	52.32	80	32	54.
November	79	20	46.91	70	14	44.23	68	30	47.49	74	20	49.
December	76	17	34.97	71	5	33.33	70	11	33.00	68	2	30.

west monthly points reached average the same in Philadelphia and ...unty; the highest monthly temperatures average, for the year, the ... lelphia and Greenbrier county, while the average of the lower ... in the latter locality. Kanawha county and Cincinnati show ...remes, the former being slightly more moderate in high tem- ... a still greater depression in low temperatures, giving a pretty ... ical range, though the mean temperature is very nearly the ... Cincinnati. As elsewhere in the interior or continental area, ... Mississippi, the extremes are greater than on the coast of lake ... nus the table above, as might be expected, gives Philadelphia a ... re less liable to extremes.

llowing table includes a record of temperature, as furnished by authori- ... in periods as follows: Lewisburg, two years, (Agricultural Report;) ... d, four years, (Darby's U. S.;) Washington, thirteen years, (Army ...gical Register;) Baltimore, four years, (record, Fort McHenry;) Phil- ... thirty-two years, (Daily Inquirer;) Cincinnati, twenty years, (Ray;) ... twenty-eight years, (record, Jefferson Barracks.)

'eriod.	Lewisburg, W. Va.	Richmond, Va.	Washington, D. C.	Baltimore, Md.	Philadelphia, Pa.	Cincinnati, Ohio.	St. Louis, Mo.
.....	35.4	33.7	34.1	32.8	31.8	33.1	32.6
.....	34.2	39.8	36.7	34.2	32.3	34.1	35.1
.....	44.4	47.1	45.3	42.3	41.0	43.5	45.1
.....	53.8	54.7	55.7	52.7	51.8	54.1	57.1
.....	64.9	65.4	66.3	63.1	62.5	63.6	66.3
.....	69.0	73.8	74.4	71.6	71.5	71.4	74.1
.....	77.1	77.6	78.3	76.7	76.0	76.5	78.0
.....	73.9	74.8	76.3	74.7	73.2	74.2	76.4
.....	68.8	67.1	67.7	67.8	63.8	66.0	68.1
.....	53.5	57.5	56.7	55.7	54.5	53.2	55.7
.....	45.0	44.2	44.8	45.1	44.0	42.5	43.1
.....	35.4	38.1	37.3	35.6	34.5	33.8	33.8
.....	54.4	55.7	55.8	52.7	51.8	53.7	56.1
.....	73.3	75.4	76.3	74.3	73.6	74.0	76.2
.....	55.8	56.3	56.4	56.2	54.1	53.9	55.6
.....	35.0	37.2	36.1	34.2	32.9	33.7	33.8
.....	54.6	56.2	56.1	54.3	53.1	53.8	55.5
.....	1,800 ft.	120 ft.	80 ft.	10 ft.	40 ft.	543 ft.	472 ft.

...f the winter and spring temperature at Lewisburg is remarka- ...ult result in part, at least, from the prevalence of southerly and ...ly winds at that season. It will be seen that the summer tempera- ...r than that of any other point named. The purity of the summer ...point modifies the effects of the heat, and relieves it of sultriness and ... influence of a vitiated atmosphere.

...e of the five hottest days in five years, from 1832 to 1836 inclu- ... to the record of J. H. Diss Debar, taken in Doddridge county, ...eographical and thermal centre of the State, is 90° Fahrenheit, ... the coldest days, for the same period, 6° Fahrenheit.

...ely broken character of the surface there are sheltered ... n the summer sun must pour a merciless flood of fiery ...teaus, or elevated slopes, over which the wintry wind must

sweep in fury. This very fact of unevenness furnishes a choice of ple sites for comfortable residences, of localities for vineyards and orchards, and a general adaptation of situation to circumstances.

RAINFALL.

The distribution of rain in West Virginia is admirably calculated, in qu and seasonableness, to insure success to husbandry and give facility to successive operations. The spring opens early, and with its opening tle and frequent showers. The summer, with less humidity than any surr ing State, is not subject to long-continued droughts. The grasses spring gr and fresh upon the summits of the loftiest mountains during all the sun r.

The amount of rain precipitated in West Virginia is from 32 to 36 only, as indicated by partial records kept in different parts of the State, a especially in the vicinity of Lewisburg and the White Sulphur springs, wh the same quantity was indicated on both sides of the Alleghanies. The mean annual rainfall decreases to some extent southward from Pittsburg, and its minimum quantity is found in summer. No complete record of the rainfall of localities in West Virginia for a term of years being at hand, it is fair, from partial data at different points, from general statements in Blodgett's Climatology and other works, and from expressed opinions of the most intelligent residents, to take Pittsburg, in Pennsylvania, as a basis of comparison between western Virginia and other localities, with the balance of authority in favor of a slightly lower figure for the average throughout the State than is given in the following table for that city:

Place.	Spring.	Summer.	Autumn.	Winter.	Year.
Cambridge, Massachusetts	10.85	11.17	12.57	9.89	44.48
New York city	11.69	11.64	9.93	10.39	43.65
Philadelphia, Pennsylvania	10.97	12.45	10.07	10.06	43.56
Pittsburg, Pennsylvania	9.38	9.87	8.23	7.48	34.96
Washington, D. C	10.45	10.52	10.16	11.07	41.20
Cincinnati, Ohio	12.14	13.70	9.90	11.15	46.89
Hudson, Ohio	9.76	8.87	6.16	8.00	32.79
Milwaukie, Wisconsin	6.60	9.70	6.80	4.30	27.20
St. Louis, Missouri	12.86	14.09	8.71	6.29	41.95

The only region here shown to be of like humidity is that of the lakes, of which Hudson, Ohio, is a representative. From data believed to be reliable, the Kanawha valley is characterized by a rainfall almost precisely similar to that of the country bordering upon the southern and western shores of Lake Erie.

SALUBRITY.

It would scarcely need the corroboration of sanitary facts to prove the healthfulness of this region. The altitude, the irregularity of surface, the absence of marshy plains, so peculiarly characteristic of West Virginia, would give, in connexion with its medium temperature, assurances of health and longevity to her population. The following is an exhibit of the yearly per-centage of mortality, for twenty years past, in the different sections of the country:

Place.	1850.	1860.
Mississippi valley, proper	2.38	1.81
Southern Atlantic coast	1.45	1.34
New England	1.25	1.24
Interior areas	1.19	1.32
Alleghany region	.96	1.08
Northwestern States	1.01	.98
Pacific coast	.92	.95

sections of greatest salubrity are the Alleghanian, northwestern, ; yet, in view of the fact that the northwest and Pacific are virgin , led with a youthful and middle-aged population, while the Alle- reg nas a homogeneous and home-staying people, we must conclude, the above per-centages as an accurate basis of calculation, that the t Alleghanies are of equal, if not superior, salubrity.

range extends nine hundred miles, nearly parallel with the of ridges fifty to one hundred miles apart, and parallel with v ea l wooded to their summits, with extensive and fertile s D re . 1 Blue Ridge, Alleghany, and Cumberland, with many visio , North Mountain, Laurel Hill, and Greenbrier, are but great Alleghany system. That portion of this section embraced in ia abounds in many a plateau, with an elevation just sufficient to l] s and bracing atmosphere, and all conditions essential to vigorous y growth, both in animal and vegetable life.

SURFACE AND SOIL.

THE VALLEY COUNTIES.

lower part of the valley of Virginia, from Harper's Ferry west to the of the Alleghanies, embracing the counties of Jefferson, Berkeley, , Hampshire, Hardy, and Pendleton, is included in West Virginia. For ty and fertility of its soils, fine water-power, central position, salu- and delightful climate, beauty and grandeur of scenery in plain and on in, it can literally, and with severity of truth, be said to be unsurpassed, lled, in the United States, as a farming region in which to make homes opulence, and refinement.

ct is a little more than three thousand seven hundred square miles in bounded on the east by the Shenandoah, and on the north and by Potomac and its north branch. The eastern front ridge of Al n is near the western boundary; Hampshire, Hardy, and Pen- intersected by parallel ridges and valleys of the Alleghany range; :h m(tain range extends in a similar direction, and the North a for the eastern boundary of Hardy county.

the most southerly of these counties, is very mountainous, has a va of 2,000 feet above the sea level. North mountain is on its boundary, and Jackson mountain intersects it. The north and s of the south branch of the Potomac, and the south branch itself, county, and afford some fine alluvial soil for corn and wheat and the uxuriant pasturage. The mountains are covered with the densest timber.

north and south branches, this section is drained by the Caca- Lost river. The Opequon forms the southeastern boundary of county. Lost river is one of the wonders of nature. After coursing a fertile valley for twenty-five miles, it breaks through the Lost River and bursts the barriers of Timber ridge, and then encounters a new m Sandy ridge, which it passes by a curious piece of fluvial strategy, way among the loose rocks of the underlying strata, but loses itself ranean meanderings of three miles, coming to the light again rather in of strong springs, than as the powerful current of a river which has y, to become anew the sources of a considerable stream—the Cacapon.

in Hampshire, 26 miles northwest from Winchester, is another ity worthy of mention. At the western base of the mountain, some 700 feet high and very precipitous, is an area of 100 yards breadth of 30 feet up the mountain side, covered with loose at all seasons of the year, blocks of ice of several pounds d. Snakes passing over the rocks stiffen and die, and flies

perish in the same way Butter or fresh meats are preserved here al definitely. At the base of this bed of ice flows forth a spring of int ly water; and yet these rocks are exposed to the rays of the sun after 9 o' in the morning.

The hanging rocks near Romney, 400 feet high, are notable curi i

In Morgan county, two and a half miles from St. John's run, on t more and Ohio railroad, and thirty-six miles from Winchester, are the Mineral springs, much frequented, as they have been since the days of when Generals Washington and Gates, and Charles Carroll, of Carro attested their virtues, and built cottages there for summer residence. Tw hundred gallons per minute are said to flow through the bath-rooms of present establishment. The baths are much celebrated from their cl and quantity and agreeable temperature, (74°,) and the scenery around is m picturesque. The Maryland Gazette, in 1784, said of it: "In Berkeley c five bathing-houses, with adjacent dressing-rooms, are nearly complet assembly room and theatre are also constructed for the innocent and r amusements of the polite who assemble there." Near these springs is a t tain of chalybeate waters, which stimulate like strong tea.

In Hampshire county are the medicinal waters known to travellers as the Capon springs, four miles from the Cacapon river, on the west side of the North mountain. The Shannondale springs, near the Shenandoah river, a few miles above Harper's Ferry, have been celebrated for their efficacy in scorbutic affections. Several ebbing and flowing springs exist in this region, and a subterranean river, an affluent of the Shenandoah, is said to furnish a winter resort for millions of the finny tribe, multitudes being caught in fall and spring as they enter and return.

The valley is mainly of a limestone formation, with some sandstone and patches of red and black slate. The Opequon runs through a narrow strip of slate soil, of inferior fertility to the fine limestone region on either side of it, in Jefferson and Berkeley. These counties, it has been said, "contain a greater portion of fertile lands than any other section of the State." The face of the mouth of the valley between the Blue Ridge and Little N mountain was originally a broad rolling prairie, with fringes of timber on wa courses. Some portions of this district towards the mountains contain a portion of what is termed "liver soil" by the farmers, productive in wh grasses. The South Branch valley has a soil noted for its fertility, its su wheat, and the perennial freshness and succulence of its summer verdure. markets of Baltimore and Washington and the stock-dealers of Maryland Virginia attest the fatness and the flavor of stock reared and fattened in mountain valley.

The valley lands of this section, in various locations and states of improve ment, have commanded from $30 to $150 per acre; highlands under culti tion, from $5 to $50; wild lands, from 25 cents to $10 per acre. The hig are in high esteem as sheep farms, and have contributed much in this b of husbandry to the wealth of this region.

Table of farm lands and farm stock in the valley counties in 1860.

	Acres of improved lands.	Acres of unimproved lands.	Price per acre.	Value of farms.	Value of farm implements.	Number of sheep.	Value of live stock.
n.....	85,735	24,348	$51 84	$5,652,143	$119,176	7,269	$466,168
y.....	90,892	41,231	26 84	3,547,566	79,976	7,057	335,757
.....	27,147	48,116	6 37	479,987	27,931	2,992	111,439
lire.....	172,690	376,640	7 18	3,947,900	166,316	21,287	763,454
.....	85,564	200,927	9 00	2,579,581	57,753	11,378	453,768
ton.....	81,184	220,642	5 32	1,606,532	47,838	14,143	371,228
	543,212	911,904	12 24	17,813,709	498,990	64,126	2,501,814

Table of farm products.

nties.	Bushels of wheat.	Bushels of rye.	Bushels of oats.	Bushels of Indian corn.	Tons of hay.	Pounds of butter.	Value of slaughtered animals.
on.....	422,514	15,198	54,798	358,267	6,259	131,684	$110,221
ev.....	237,576	18,672	76,176	275,525	8,031	160,069	93,555
.....	19,404	16,082	10,122	47,575	1,576	61,152	21,325
.....	106,310	75,257	49,259	375,090	11,366	239,360	109,834
.....	39,946	28,043	20,200	286,618	4,688	102,603	71,698
.....	11,475	11,927	16,516	122,997	4,165	101,838	45,319
.	837,235	165,179	227,071	1,466,072	36,085	796,706	451,952

exhibit indicates what may be done for West Virginia by immigration, s for intercommunication, and development of her resources of forest, rals, and water-power. A portion of this territory is more precipitous than the country west of the mountains; very little is richer in soil the arable lands of the State generally; and yet the whole tract, to the of the Alleghanies, is valued at $12 24 per acre. Jefferson county, verage of $51 34 per acre for farming lands, almost double the average ate of Ohio, illustrates well the market value of a central position, to great markets, over the richest prairies thousands of miles away. wo and a half millions of dollars in live stock, nearly half a million y in butchers' meat, almost a million pounds of butter, three u els of grain of all sorts, little less than two hundred thousand wool, other wealth of the farm in like proportion, in six small it oe said that West Virginia is a poor locality in which to

THE MOUNTAINS.

The mountain section proper has an elevation from 1,300 to 2,500 feet a the sea level, including Preston, Tucker, Randolph, Hardy, Pendleton, Poc hontas, Greenbrier, and Monroe counties. Those north of Greenbrier and of the summit of the main ridge may appropriately be considered to They are covered with heavy timber, with isolated patches of improved including but 226,632 acres in the four counties. Springs are abundant comparatively scanty in summer, and fall abruptly over precipitous le near their sources, and expand into quiet rivers, with occasional rap lower valleys, forming valuable mill seats.

The soil is excellent for grasses, much of it containing a good admixture of clay. With indifferent culture it produces from thirty to fifty bushels per acre of corn; in some cases a much larger yield. Wheat usually gives fifteen to twenty bushels. But the greatest value exists beneath the soil, in iron and bituminous coal, and other minerals.

High among the western ridges of the Alleghanies, south of the Cheat mountains, and between the Alleghanian backbone on one side and the Black and Droop mountains on the other, lies Pocahontas county, 76 miles in length by 17 to 20 in breadth. The mountain springs of this elevated region contribute to swell the waters of the James, Potomac, Mengetia, Elk, and New rivers, while the Greenbrier flows through the entire length of the county, at certain points through a beautiful valley.

In their rough mountain heights, remote from railroads and navigable rivers, dwell 3,958 hardy mountaineers, occupying 828,921 acres in farms, (less than ten per cent. improved,) worth $2,051,780. Sheep husbandry flourishes here, (numbering 10,338 animals, producing 23,041 pounds of wool,) and cattle abound. The total value of live stock is $328,002. The production of 121,310 pounds of butter and 6,225 pounds of cheese, in addition to liberal supplies of milk for prolific households, indicates no mean capacity for dairying. Of Indian corn the product is 48,229 bushels; rye, 10,778 bushels; wheat, 8,933 bushels; flax fibre for the supply of the old spinning wheels, 1,684 pounds; and of home-made sweets, 65,725 pounds maple sugar, 2,559 gallons molasses, and 866 pounds of honey. The value of their animals slaughtered is $41,554; of their home manufactures, $14,846. These few figures are given merely to show that the Alleghany mountain tops, among the most remote and inaccessible portions of West Virginia, may and do contain the homes of comfort and plenty, and sturdy independence.

The mineral resources of Pocahontas are valuable. Iron ore is found, to produce 83 per cent. of pure metal; and lead, copper, and silver exist. Co crops out along the ranges of mountains on the western boundary, which is eastern border of the great coal basin.

The heavy and valuable timber of this region, and abundant water-pow everywhere at hand, will at some time combine to add materially to the we of this mountain region.

Randolph is the next county north, upon the western declivity of the Alleghanies. It is still large, though its former proportions are much reduc having now, in farms, 48,249 acres improved, and 278,083 unimproved, with population a little less than five thousand. It has, of course, immense t of wild lands not included in farms. The soil is productive in grasses, and few patches in cultivation support 8,103 cattle and 7,565 sheep. The liv stock is valued at $244,857. Of maize there is produced 55,225 bushels, 20,! bushels of oats, besides wheat, rye, potatoes, &c.; of maple sugar, 43 pounds, and 1,351 gallons molasses, and 1,370 pounds of honey.

The headwaters of the Cheat and Tygart's Valley rivers drain this county The valleys produce good wheat and corn, and the mountains make fine pas-

heir summits when denuded of their heavy timber. Coal, iron, and
e abundant, and other minerals exist.

c ty lies between Randolph and Preston, south of the Baltimore
r l; has a small area, containing farm lands, 11,101 acres im-
. 45,059 unimproved, with but 448 houses, and producing 19,955
: corn, 6,049 of oats, 4,346 of potatoes, (and even a few sweet pota-
3 pounds of honey, and other products in proportion.

most northern of these mountain counties, wild and comparable as it is, and undeveloped in its vast mineral resources, still
r slight beginnings of improvement made in the last few years and
o ing of railroad communication through its borders, what com-
ı ty and wealth will one day be added, by labor and skill and en-
to the wild attractions of these highlands. Let the reader compare
of progress and production with the exhibit made by other moun-
equally favored by nature.

opulation is 13,312. It has 92,663 of improved land in farms, and
acres of unimproved, worth $2,257,314—nearly eight dollars per acre.
number 19,084 sheep; cattle, 11,430; horses and mules, 3,367; ani-
ughtered yearly, $80,407; wool, 47,493 pounds; butter, 340,988
cheese, 9,142 pounds; and value of live stock, $461,133. With all
ty-three thousand domestic animals, so mild is the winter of these
valleys that but 5,308 tons of hay are cut, and 104,317 bushels of
rested. Of corn there is produced 71,063 bushels; wheat, 8,933
rye, 10,778 bushels; potatoes, 44,655 bushels; and buckwheat, 95,357
Flax is grown to the extent of 5,355 pounds of lint; maple sugar,
nds; honey, 15,474 pounds; maple molasses, 1,721 gallons; and
as it may seem for mountain regions) sorghum sirup, 539 gallons.

] lant water power, there is as yet little manufacturing done. There
ıl woollen factories, several shops for the manufacture of "shooks,"
c rel staves,) tanneries, &c.

llowing extract from correspondence of the department is furnished
agans, of Brandonville, in Preston county:

n county, geographically, lies in the right angle formed by the Maryland and Pennnes, and is several miles west of the main Alleghany range, though east of, and
n the west by, Laurel hill, the most western member of the great Apalachian chain.
y has an average width, from east to west, of twenty miles, and is traversed by
r from its south end north some twenty miles to the mouth of Muddy creek, within
es of the Pennsylvania line, where it deflects to the northwest, forcing its way
ty hills, and Laurel hill itself, and debouches into the Monongahela just within
f Pennsylvania. Sandy creek, rising in Pennsylvania, east of Laurel hill, takes
r course, and joins Cheat river before that stream passes through the mountain.
ton county is chiefly included in a basin, bounded on the west by Laurel hill, and
ninous range on the east, called Briery mountain, which mountain, however, runs
s west of, and nearly laterally with, the Maryland line, and the space between
and mountain is occupied chiefly by a part of the region called the 'Yough

gh our county lies principally in a basin, it is for more than two-thirds of its length,
the south. geologically more elevated than the mountains on either side, which is
eas n declination of the great limestone vein which crops out on the west, at
. hill. l the western declination of the same stratum cropping out at the
n on the east, other rocks and minerals conforming substantially
on and proof of this fact is afforded where Cheat river cuts its way
] the centre of this rugged passway, this great calcareous stratum is
t above the troubled river, and, travelling up the struggling stream, it
rate of about two and a half degrees, and at a short distance below
ak, where the river has made its course northwest, the limestone
ed, and is seen no more until it rises and makes its eastern out-crop,
this great limestone seam are found nearly all our minerals—that
eight feet, and some minor seams of bituminous coal, all of which,
as well as in quality, in different localities. In the southern sec-
ecially at Tunnelton and Newburg, on the Baltimore and Ohic

railroad, and its vicinity, has our mineral coal wealth been most developed, as well as its superior quality, yielding, as is proved by analysis, about 10,000 cubic feet of gas per ton of 2,240 pounds. The seams worked at these localities are from six to eleven feet in thickness, and the same are found to range through all those neighborhoods.

"Our whole county is underlaid by these bituminous seams, though in most parts feet is the heaviest vein that has yet been developed. Cannel coal has also been found manufactured to some extent into oil.

"Interspersed with our coal measures are corresponding veins of iron ore, of nearly al varieties and forms of the hematite class found in the Alleghany range. These ores fused, more or less, through every farm in the county, and are found in many loc strata, pure or intermingled, ranging from one to four feet in thickness, and yielding thirty-three per cent. iron. But little attention has been hitherto bestowed upon this great and indispensable element of our wealth. The see-saw policy that has resulted from the prevalence of antagonistic parties has at one time encouraged, and at another discouraged, enterprise in the manufacture of iron, and finally ruined thousands who had engaged in it. These are among the reasons why our rich iron ores have not been better developed and turned into the great channels of commerce. I believe but four blast furnaces have ever been built in the county. Two of them, many years since, near the northern section, and distant from water transportation, have fallen into dilapidation. Two others have been erected about eight years, and are now in successful operation—one near Independence, on the Baltimore and Ohio railroad, with hot blast, producing some seventy tons per week; the other on Muddy creek, near Cheat river, cold blast, capable of producing forty to fifty tons per week. These are moderate sized half-stacks, supplied with inexhaustible beds of rich ores, and all the elements for the manufacture of iron, in close proximity. Though on a small scale, these two furnaces prove the richness of our ores, as the ore at Muddy creek produces one ton of good foundry iron from two tons of roasted ore, and I believe the other yields nearly the same. Such establishments, and more extensive ones, might be multiplied indefinitely through the county. I have no doubt that there are some locations in other parts of our great country more favored with means of transportation or proximity to a ready market than is this, but such fortunate places are generally occupied, while we have abundance of the best elements of iron yet inviting the hand of industry and enterprise.

"Of timber we have all the varieties common to our latitude and altitude, but the different kinds of oak, of the finest quality, predominate. Pines are rare, and spruce and hemlock are seldom met with, except near the 'Glades,' or on the borders of our small mountain streams. No country can furnish superior wild cherry, and walnut and butternut abound on our alluvial and richer soils. The magnificent flowering poplar is found in great abundance on our better class of soils, surpassing all our forest trees in magnitude, and is in great request for lumber. We have, also, hickory, ash, sugar maple, and the minor species of timber in ordinary and sufficient supply.

"Our soils run through every grade of fertility, from the argillaceous to the silicious, l a generous loam, with a substratum of clay, slate, or sandstone, predominates. A light st.- tum of limestone is found near the surface in most sections of the county, varying in thickness from one and a half to four feet; but the great vein before spoken of ranges from forty to sixty feet in thickness, and is of superior quality. Our river bottoms, though limited in extent, are very fertile, which, with much of our higher lands, especially in the central and southern portions of the county, are well adapted to the growth of Indian corn, while every part at all susceptible of cultivation would produce abundantly all the cereals and l grains, if treated with fair and liberal cultivation. Even with our present wretched sy.. of culture our soils yield remunerative crops. Our agriculture has been slightly improv.. within the few past years, but it is still miserable and exhaustive. But ours is pre-eminently a grazing country, and already much success has rewarded those who have engaged in it Dairies are springing up and yielding large returns. Sheep husbandry has already enlisted the attention of very many of our citizens, and, although in its infancy, it is probably the most remunerative pursuit of our people. This element of our wealth will undoubtedly, no distant day, stand pre-eminently above all others, our minerals excepted."

THE "PANHANDLE."

The little point upon the northwestern boundary, entering as a wedge betw the Keystone and Buckeye States, is regarded with careless wonder by casua map observers, who cannot account for so strange a freak in surveying, yet it easily accounted for when it is recollected that Virginia once owned the territor west of Pennsylvania and north of the Ohio river, and that that river becam the line between Virginia and Ohio, leaving the four small counties, Marshall Ohio, Brooke, and Hancock, between Pennsylvania and Ohio. They comp little more than the area of an average county, and contain 169,626 acres o improved land, and 111,513 unimproved, or 281,139 in farm lands, valued

088,077, or $32 14 per acre. Marshall, the largest, averages $20 46; Ohio, 1 17; Brooke, $44 11; and Hancock, $34 12.

figures it may be seen that this region, so broken and irregular in ıy the upheaval which the forces of nature have wrought in the lapse of become, through the agency of intelligent and persistent labor, a nd fruitful garden.

l c ıty, named in honor of Chief Justice Marshall, has a river front ı l an eastern border of twenty miles on the Pennsylvania line. ıı Ohio bottoms, and those upon small local tributaries, Fishing and Grave , the county has a fair share of alluvial soil, much of which is very e, yielding 80 to 100 bushels of corn under judicious and careful cul- . ıt was here that William Alexander, a few years since, produced 288 of corn upon two acres, for which he received a premium. One field, to attention of the writer has been directed, has been in cultivation in ıor sixty consecutive years, without manuring, and the yield has been re- to twenty bushels by the gradual depletion of the soil. One of the old- s here gives as the accustomed system of husbandry a twenty-one cou , namely, twenty years in corn, and a *rest* of one year in wheat, to owed by twenty years in corn again.

uplands, which are slopes of hills and small valleys, with comparatively evel land, are generally rich, as is indicated by an abundant production s and grasses, and exports of stock, corn, wheat, and fruit, especially Good crops of potatoes are usually secured, variable in quality, with season, and culture, from 50 bushels upwards, a yield of 800 bushels per e having been known, and even 1,000 bushels of the large reds.

ellent crops of wheat are usually obtained. Hon. James Burley has than once secured 40 bushels per acre, and others have had similar suc- while the usual average is about the same as for the State of Ohio, scarcely a third of that quantity. Oats and barley do very well, and good s produce from two to three tons of dry hay per acre.

s formerly threw their manure into the river; they are now learning of its value, and are beginning to husband carefully their resources ıeru tion. As a means of enhancing fertility, the value of sheep is be- to be appreciated. An instance may be given of an old field grown up , which, with no other manure than the droppings of sheep, aided a by the folding of mules, gave a return of 100 bushels of corn per acre.

s county forms the junction of the "Panhandle" with the great Virginian lf, and partakes largely of its characteristics, a diversified surface, slopes nes gentle and sometimes abrupt, alluvial formations in valleys, and a re than average general fertility, whether in valley or upland.

county, in which Wheeling is situated, is in a high state of cultivation, from 37,487 acres of improved land, amounting to less than two of the government surveys, 1,441 horses and mules, 1,408 milch 240 working cattle, 1,380 other cattle, 40,050 sheep, 3,244 swine, altogether, $253,090; and producing 20,048 bushels of wheat, 5,639 of 138,4 of corn, 82,101 of oats, 22,072 of barley, 4,372 of buckwheat, ı Irish potatoes, 823 of sweet potatoes, 128,448 pounds of butter, pc ıds of wool, 6,479 tons of hay, besides the value of $14,420 in (, $10,174 in fruits, $26,930 in slaughtered animals, and a variety uctions.

nas been cultivated with uniform and very gratifying success in the ou ıeeling, both on the hill slopes, at the top or near the bottom, and unds of the river. Low lands, especially islands, have been localities as sites for vineyards, but a look at the islands of this ı ice to solve the mystery of their adaptedness. If subject to) at rare intervals of winter or spring floods, the water soon

subsiding, and settling through the gravelly substratum with a rapidity al coincident with the subsidence of the river itself. If the vine were potted by skilful gardener, the drainage would scarcely be superior. In such a soil great expense for trenching is an entirely unnecessary part of the l r preparing ground for a vineyard. The island at Wheeling, known as island, and owned by descendants of the original owner and pioneer o name, has a large vineyard, which gives annually a yield greater average yield of American vineyards. When new vines are added, the g is broken thoroughly sixteen inches deep, with three horses, then furrow holes dug one foot deep in the furrows for the reception of the vines. Zane, one of the proprietors, claims an average product of 500 gallons of per acre.

A fine vineyard of J. B. Ford and others, a few miles below Wheeli the breast of one of those heavy slopes, is a good illustration of the capab of the bluff lands for grapes. Being covered with a heavy forest growth, expense of starting the vineyard was much higher than it otherwise would been. The timber felled, and the stumps dug out, a furrow of twenty i deep was cut with a mammoth plough, and the roots so effectually erad that no sprouts have ever appeared. The soil was a clayey loam, with a mixture of shale. The vineyard comprises 14½ acres, and with enclosu building improvements cost about $500 per acre exclusive of the l d, overlies a coal mine. The product of the fourth year from planting gallons of wine, mainly Catawba; the fifth year (1863) yielded 4,000 ga or nearly three hundred per acre.

Few localities in the country can claim so large and sure results of vine c ture during ten years past as are shown in this county. It is an interest rap idly growing here, and evidently destined to continue in prosperity.

Other fruits succeed here admirably. Among pears, the Bartlett, Sec and Duchess d'Angouleme seem to be favorites, and some, when asked to n six most desirable varieties, would duplicate the three already given. Winter Nelis gives high satisfaction as a winter pear.

The favorite apples are the Yellow Bellflower, Rambo, Putnam, Russet, Beauty, and Northern Spy. The Rambo is the most productive on the bo lands. For early marketing, the Yellow June-eating is highly regarded, a heavy bearer every year.

The fertility of the soil is plainly shown by the size of forest trees, and th rapidity of their growth. The writer has noticed in the grounds of L. Lum ford, a tree twelve years old, which is twenty-two inches in diameter. F the ashes of log heaps spring up locusts with great rapidity. A sedate truthful man alleges that they have been known to grow to the heigh one foot before the log heap had done burning. An opening in the woods, the least exposure of the surface to the sun, is immediately covered wit carpet of green. Vegetation is everywhere luxuriant as the farmer could d

Brooke county lands are of equal fertility and value, and show a similar of products, with a larger yield of wool, corn, and wheat, and a greater of live stock and slaughtered animals.

Of the peculiar adaptation of the mountain slopes and valleys of Virginia sheep husbandry, there is abundant evidence. Where circumstances favored population, this interest, by inevitable gravitation, has settled o into a permanent and prominent place in farm industry. The "Panh furnishes a notable illustration:

Counties.	Farm lands.	No. of sheep.	Lbs. wool.
	Acres.		
.....	49,132	21,402	60,214
.....	55,488	40,620	112,774
.....	54,840	40,050	102,032
.....	121,679	10,022	27,385
otal.....	281,139	112,094	302,405

a of a county of average size, little more than five hundred square
281,139 acres in farm lands, supports 112,094 sheep—one for every
the entire tract, inclusive of wild or waste lands; one for every
half acres of the actual farming lands; and in the three counties
heeling, one for every acre and a half. In fact, for 110,490 acres of
land in Hancock, Brooke, and Ohio, those counties have 102,072
lmost an acre to each sheep, rivalling England itself in numbers com-
th area, and far distancing Ohio, whose productive acres are more
with sheep than any State in the Union, having eight acres to each
1860, with a great increase since.

ould look like giving up pasture and field to sheep, and leaving no
cattle or grain; but, no—there is undoubtedly more of these products
sheep were absent, the flocks of the farm adding more to its fertility
r subtract from it. The following table shows that sheep husbandry
diminution in price of lands, or extent or variety of farm products:

Counties.	Value of farms.	Price per acre.	Value of live stock.	Bushels of wheat.	Bushels of Ind. corn.
.....	$1,676,745	$34 12	$182,746	16,423	61,346
.....	2,447,903	44 11	282,439	23,490	142,122
.....	2,423,520	44 17	253,090	20,048	138,430
.....	2,489,909	20 46	280,860	74,759	241,911
al.....	9,038,077	32 14	999,135	134,720	583,809

curious fact, that lands of Brooke and Ohio (one with a large city,
] ing no towns) are almost precisely alike in price, in exact propor-
number of sheep kept; while those of Hancock, with flocks 40 per
numerous, lose ten dollars per acre in value; and those of Marshall,
rth the number of sheep in twice the area, have less than half the
twenty dollars per acre.

be said here that sparseness of population accounts for diminished
oducts. Hancock has a population of 4,445, and Marshall of
a slight advantage to Marshall; Brooke has 5,494, and Ohio
ne price of their lands is the same. It would seem that the popu-
heeling have less influence than the flocks of the neighboring farms
ne price of the lands of the county!

tain regions are unexcelled as sheep walks, and are beginning to
ed as such. Preston has 19,084, Monroe 12,288, Greenbrier 16,067,
14,143. The whole State is waking up to the fact of its peculiar
to this business. Yet it is only a beginning that has been made.
sheep already there (453,334 in 1860) is but a moiety of the
at some time contribute their triple munificence of fertilization
, and raiment to the people, to bless this new Alleghanian

THE RIVER COUNTIES.

The river counties, excepting those of the "Panhandle," and those sou the Kanawha, are Wetzel, Tyler, Pleasants, Wood, and Jackson. They tain a great variety of soil, from light silicious to deep alluvial of the ri toms, with hill-tops of decomposed shales in a large admixture of hu slopes with a sufficiency of lime and clay for certain and heavy crops or Some of the bottoms have a sandy, others a claycy subsoil. In some l the uplands along the Ohio river have a sandy loam, admirably a fruit and market-garden culture, seemingly quite light, but of a fine and texture, richly intermixed with vegetable mould. It is a quick soil, and l productive, and is easily worked, but free, becoming exhausted rapidly easily kept "in heart" by annual dressings of manure, green manuri other modes of fertilization. It is a soil that richly repays the labor skilful and industrious husbandman. There is a fine body of such s Wood county, above Parkersburg.

The counties of Tyler and Wetzel have a small proportion of bottom except upon the Ohio river. The streams are small and unimportant. hill lands, as yet brought into cultivation to a very limited extent, are ductive, and a very small per-centage of worthless or waste land exists.

Unlike the "Panhandle," this section has a much larger amount of proved than improved farm lands. In Wetzel the acres of each stand tively: 124,821 to 31,332; in Tyler, 39,794 to 97,922; in Pleasants, 1 to 36,798; in Wood, 46,199 to 94,229; in Jackson, 36,457 to 102,881. difference in improvement, with perhaps a little difference in quality, occa a great diminution of the average value, as is shown by the following tab values and products:

Counties.	Value of farms.	Av. price per acre.	Bushels of wheat.	Bushels of corn.	P tur
Wetzel	$1,176,511	$7 53	31,652	180,150	8
Tyler	1,500,003	10 89	43,729	182,239	1
Pleasants	649,220	12 36	22,785	102,172	5
Wood	1,673,864	11 92	27,488	115,046	1
Jackson	1,355,201	9 72	88,338	219,377	7
Total	6,354,799	10 14	213,992	798,984	

Considering the proportion of unoccupied lands, the proximity to the river, and the sparseness of population, this section must speedily receiv benefit of progressive and high development, and its land owners the adva of corresponding enhancement of prices. It is a successful tobacco region ducing (in 1860) 365,000 pounds of tobacco. Nor has the troubled state country prevented its culture during the war, as is shown by the fact tha tax on what has been manufactured in Parkersburg during thirteen amounts to $15,881.

An examination of the census returns shows a good variety of product a yield indicating a quick and fertile soil. In noting the quantity, it sho remembered that the population of the five counties is but 35,517, divi follows: Wetzel, 6,703; Tyler, 6,517; Pleasants, 2,945; Wood, 11,04 Jackson, 8,306. Comparatively a wilderness, it is one which flows with and honey, yielding 409,050 pounds of butter after feeding the population giving 16,077 pounds of honey, in addition to 44,266 gallons of sorghum A profitable trade in fruit, principally apples, is carried on by means o river—a trade which has extended even to New Orleans, a distance of e

d miles, and which has been conducted with scarcely more expense than
c ıundred miles by railroad. Nor has live stock been neglected. A fair
of sheep and wool have been produced, and horned cattle are profit-
ɪn and fattened. A few of these products are given in the following

ies.	Gallons of sorghum.	Pounds of honey.	Pounds of butter.	Bushels of potatoes.	Products of orchards.	Value of slaughtered animals.
.....	6,270	5,507	124,342	14,430	$7,510	$28,182
.....	11,900	6,014	130,527	23,733	11,997	35,150
nts	4,514	1,711	30,500	7,747	5,868	15,284
.....	7,266	690	12,175	33,166	2,460	51,682
on	14,316	2,155	111,506	32,630	9,281	40,260
Total.....	44,266	16,077	409,050	111,706	37,116	170,558

The price of lands in this section varies wonderfully with the state of im-
, fertility, and accessibility. Farms on the Ohio river, mostly im-
with timber for fuel skirting the adjacent hills, an orchard in bearing,
ortable farm buildings, command from fifty to one hundred dollars
The upland, nearly all susceptible of cultivation, with a surface un-
rolling, or hilly, in some places with ridges marking a very sharp
if brought under good cultivation, in favorable localities, brings twenty-
or thirty dollars per acre. Less improved, further from railroad or river,
: or poorer, can be bought for ten and fifteen, and some even for five

Ohio bottom lands produce corn, as do the best prairie and bottom lands
ne country, more according to culture than to difference in quality, at the
fifty to one hundred bushels per acre. The average of wheat, which is
n on the hills, more generally in loam than upon aluminous soils, among
and roots, and sometimes rocks, and greatly exposed to the raids of
ible inhabitants of adjacent forests, is about the same as in Ohio, per-
ourteen bushels per acre, while occasional fields produce two or three
hat amount.

od county has a great variety of soils. The northern portion is a sandy
productive, excellent for fruit and vegetables, easily kept in condition
ıt dressings of manure and judicious culture. On the Little Kanawha
is pretty stiff with clay, and in the southern portion of the county a
ne soil is found. A fair crop of corn here is about fifty bushels per acre.
face of Jackson county is rolling. Many of the hills have a lime-
some localities are characterized by heavy clay. Some of the bot-
are clay, and others alluvion based on sand or gravel.
lerable trade in grain has been carried on with New Orleans; and
e been a source of revenue in the same trade, the Roxbury, Golden
Yellow Bellflower being favorites, and producing abundantly.
a lucrative crop here. The soil is well adapted to the growth of a
lity. Corn and grass are the principal crops. There is a tendency
prominence in sheep husbandry. Five hundred sheep have
introduced from Brooke county, notwithstanding the unsettled
ıtry, and the exposure to loss from guerillas. A beginning has
grape-growing, which promises to be successful.

THE KANAWHA VALLEY.

There are few localities promising more attractions to industrial en or higher rewards to free labor, than the Kanawha valley of West Virg Climate, soil, timber, fuel, (wood above and coal below,) minerals in water power, navigation two thousand miles to the Gulf of Mexico, and the tributaries of the Mississippi, conspire to render this valley, even mated with the earlier sights and sounds of developing industries, the home of mechanic skill and intelligent labor, and consequent refi wealth, contentment, virtue, and happiness.

Its climate is mild and agreeable, with heat less intense in summer Washington or Baltimore, and a winter temperature comparing favor mildness with that of Louisville and St. Louis.

The distribution of rain through the different seasons is remarkably being not far from eight inches rain-fall in each of the seasons—spri mer, and autumn—and scarcely more than ten during the winter, or about six inches for the year.

The centre of the lower valley, or basin of the Great Kanawha, is tude 38°. The extreme length of the river is about four hundred miles. rises in Ashe county, in North Carolina, and traverses or forms the bo of six counties in Virginia and eight counties in West Virginia, viz: Monroe, Greenbrier, Raleigh, Fayette, Kanawha, Putnam, and Mason. first flows between the Blue Ridge and Iron Mountain, and in the no part of Grayson county, Virginia, it bursts the barriers of the Iron M and continues in a northeastern direction through Carroll, Wythe, and laski counties, where it turns abruptly to the northwest, winding through eral ridges of the Alleghanies, as if instinctively seeking association with future of "*la belle riviere*," Ohio, and the great "Father of Waters." crossing the Greenbrier range, and passing through Fayette county, Virginia, it receives the Gauley river from the right, spreads into a broad panse of five hundred yards, and assumes the dignity of the Great Kana Right here, two miles below the junction, and more than a hundred miles the Ohio, the stream is precipitated twenty-two feet over a ledge of rocks, a total descent of fifty feet, including rapids and perpendicular falls, plac limit to steamboat navigation, and also furnishing one of the best water po in the world.

The area drained by this noble river is stated to be more than ten tho square miles—a territory a little larger than the State of Massachusetts.

Kanawha, the first of the three counties below the falls, has an area of 1, square miles, beautifully diversified with mountains, hills, and fertile vall the highlands inexhaustible with coal, and the valleys salt, with ab saline springs. This area is intersected by the Elk, Coal, and Poco rivers, which afford enlarged facilities for manufacturing and transpo of the mineral treasures beneath the soil, the products of its cultivation, the timber which towers above it. Its population was nearly 16,150 in 1 and its assessed valuation about three and a half millions.

The river empties into the Ohio at Point Pleasant, above Gallipolis, The four lower counties of the valley, immediately connected with the r have a population of nearly forty thousand, of whom little more than th thousand were slaves in 1860.

The counties of the Kanawha valley exhibited a population, in 1860. follows:

Counties.	Whites.	Inc. of free pop'ln since 1850.	Slaves.	Agg. population.
.....	6,428	2,410	362	6,819
.....	9,536	464	1,114	10,757
.....	10,500	1,950	1,525	12,211
.....	3,291	1,562	57	3,367
.....	5,716	1,936	271	5,997
.....	13,785	1,786	2,184	16,150
.....	5,708	1,015	580	6,301
.....	8,750	.....	376	9,173
.....	63,714	11,034	6,469	70,775

lowing is a statement of the agricultural statistics of the Kanawha West Virginia, comprising the above eight counties:

quare miles	4,746
improved land	426,235
unimproved land	1,352,802
unassessed or waste lands	1,256,403
farms	$16,093,679
value of farm lands per acre	$9 03
farm implements	$334,455
of horses	14,220
of cattle	55,588
of sheep	65,589
of swine	70,350
f live stock	$2,303,280
of wheat	476,286
of rye	33,852
of buckwheat	30,659
of Indian corn	1,487,828
of oats	335,556
of flax	26,866
of tobacco	1,247,365
of wool	134,416
of Irish potatoes	95,442
of sweet potatoes	12,112
of butter	658,562
of cheese	20,144
hay	19,529
of wine	478
of maple sugar	153,362
le molasses	14,730
ghum molasses	7,902
y	74,896
d products	$28,404
nufactures	$139,481
gn ed animals	$477,589

* Decrease in free population, 89.

It appears from the above that scarcely half the area is included in fi about one-seventh in actual cultivation. A great variety of products is sp embracing almost everything cultivated in temperate latitudes. It seems ally a land of milk and honey, wine and oil.

The organization of West Virginia as a free State will give a great i to enterprise when industry resumes its wonted channels. The salt and coal, and coal oil, which exist in almost fabulous abundance, wit the ready capital and willing labor of tens of thousands of thriving and manufactures will flourish, and agriculture advance, and the wilde the past, full of floral beauty, and lavish with wild profusion as it has will blossom with a sweeter fragrance and a richer magnificence u magic touches of the hand of free and intelligent labor.

With coal at forty-five cents per ton, iron in almost equal cheapn best of timber for the cutting and hauling, coal oil defying facilities for c age, abundant harvests from fertile soils, and a magnificent river to fl products of industry to a market—what a region in which to manu sugar mills and reapers and other implements of western agriculture i

The Department of Agriculture, which has been interested in witnessing and fostering the spirit of improvement now springing into activity in this valley, has received gratifying assurances of promised success in sorghum and in cot ton and other prominent products of industry. It is a soil and climate pecu liarly favorable to those products which now claim especial prominence.

A letter received at the department from a correspondent in this valley ports a prevalent absorbing interest in the development of its resources. is interested in manufacturing, and says that nowhere in the United Stat steam power be so economically obtained. So abundant is the coal, in proximity to the factory, that it can be run into the engine-house at a c *forty-five* cents per ton. Of this coal there are "four seams above water le within a vertical distance of 240 feet, giving an aggregate thickness of 17 or 25,000 tons of coal to the acre, consisting of gray splint, rich bitumin block splint, birdseye cannel, steam and smiths' coal." This is within miles of Charleston, on navigation.

With such mines of undeveloped wealth, above and below the soil, and water power, and in facilities for a highly developed agriculture, what shall hinder the progress in population and wealth of this southern section of now free and regenerated West Virginia?

Greenbrier county has been settled for eighty-three years. It occu depression of the Alleghany range, the mountain summits scarcely more t two thousand feet high, and the mean elevation of the arable lands of the co fifteen hundred. The soil is, much of it, strongly impregnated with li consists mainly of a rich, black, friable loam. Such soils, in the southern slo of hills and in the valley of the Greenbrier, produce abundant crops of ordinarily from thirty to fifty bushels per acre, with careless culture, and seventy five to one hundred bushels on the best locations, with skilful managem The soil and climate peculiarly adapt this region to the purposes of the gr If a ray of sunlight can reach a spot in the densest forest, that surface becomes green with the blue-grass sod. Thousands of cattle yearly dep those mountain plains and slopes.

In Greenbrier are the famous "White Sulphur Springs," among the renowned of all the fashionable watering places of the continent. Their wate are impregnated with carbonic and nitrogenous gases, sulphates of lime, an magnesia, and carbonates of lime, iron, iodine, and phosphorus. This who region is interspersed with fountains of high medicinal virtues. The "Bl Sulphur" is also in Greenbrier. In the adjoining county, Monroe, are foun the "Red," "Sweet," and "Salt Sulphur."

It is not alone to its mineral waters that the attraction of this region is du

ıy breath of spring invades the atmosphere of summer; pleasurable
ıion tempers the sultriest of July days; the blue grass maintains its
ıxu ıce through the dryest season; and scenes of rural beauty, out-
ın those elevated plains and mountain slopes, fill the eye with their
magnificence. Thousands in each summer season gather here
ned atmosphere of cities.

s ago Jefferson wrote of a "burning spring" as follows:

nds of the Great Kanawha, seven miles above the mouth of the Elk river,
ıove that of the Kanawha itself, is a hole in the earth of the capacity of
y gallons, from which issues a bituminous vapor in so strong a current as to give
about its orifice the motion which it has in a boiling spring. On presenting a
dle or torch within eighteen inches of the hole it flames up in a column of
diameter, and of four or five feet in height, which sometimes burns out within
, and at other times has been known to continue three days, and then has
burning. The flame is unsteady, of the density of that of burning spirits, and
burning pit coal."

Tl "spring," so called because it contains water after a rain, is yet in ex-
ce; the gas, still issuing to some extent, is carbureted hydrogen. It is on
ntered by General Washington, one acre of which is reserved by his will
of the public. The flame resembles that of burning whiskey. It was
s turned to useful account in clothes-washing, the water boiling till
ed, and the gas, which bubbled through small orifices in the sand, con-
to burn till extinguished by wind or other agency.

years ago, or more, in boring in this vicinity to the depth of nine
reet for salt, similar streams of gas were struck, which poured forth a
ne, and were employed in a salt furnace for heating purposes, being
alent to eight hundred bushels of coal. These have ceased to flow, but
s are still used, supporting combustion in a salt furnace equal to two
bushels of coal.

es S. Richardson, of Briarport Mines, on Coal river, has experimented
with cotton, tobacco, sorghum, and other seeds from the department,
nable success, under unfavorable circumstances. The tobacco, which
ed very late, and was therefore partially destroyed by frost, yielded
ounds per acre, of superior quality, compensating fully in price for the
ency in quantity. The sorghum, planted when it should have been in
growth, had ripened no seed when attacked by the notable frosts of
autumn, and yet 160 gallons of sirup per acre of excellent quality were
a quantity greater than the average throughout the best sorghum dis-
Besides, a miserable wooden mill was employed, with an estimated loss
lons of sirup per acre.

produced in thirteen weeks, from the seed, well-formed specimens of the
ch long turnip, weighing $3\frac{3}{4}$ pounds, $10\frac{1}{2}$ inches long, and $5\frac{1}{2}$ inches in
h.

cotton, which came up about the middle of June, was, of course, deficient
per season for growth, yet yielded a few open bolls. No portion of
Illinois or Kansas could have done better.

SOUTHERN COUNTIES.

ounties south of the Kanawha, Mercer, Raleigh, Boone, Cabell, Wayne,
oming, and McDowell, are isolated from markets, mountainous,
great part with original forests heavily timbered, well watered by the
ıue, ndy, and other rivers, and exceedingly rich in iron. coal, and
. The minerals will at some future day be valuable, and the soils
the production of fruit, wool, and butcher's meat. It is intersected
in continuation of the Cumberland range, and nearly all of it
great coal measures of the Ohio valley.

Mercer county, perched upon the slope of the Alleghanies, is drai d by New or Kanawha river and several small tributaries. Great Flat-top extends along the northwest border. Excellent pasturage exists wherever ests are girdled or felled. But one-sixth of its farms are improved, yet yearly exhibit of animals slaughtered is $58,132, and its corn am 131,654 bushels, wheat 43,131 bushels, and oats 55,843 bushels.

Raleigh, with 116,945 acres in farms, has but 11,632 acres which proved; consequently the average value is reduced to $3 54. Its cer a proportionally small exhibit. Quite a prominent place is given to tobacco which 34,827 pounds are cured. Of flax, 2,002 pounds are prepared. It drained by the head streams of Coal river, and bounded on the east by l river, and slopes toward the northwest.

Boone county is drained by Coal and Little rivers and Laurel creek. It named in honor of Daniel Boone, and is yet to a great extent as wild a fo that adventurous pioneer could desire. Yet it has 15,054 improved es, 218,873 unimproved in farms, valued at $2 22 per acre. Its live sto at $120,589; its corn yields 143,808 bushels, about ten bushels to every of improved land, in addition to a variety of other farm products, including and some pasturage, although woods and pastures are adequate to a fair sup of stock in summer, and a partial supply of winter feed. A good idea of dependence placed upon winter pasturage and corn fodder may be had from fact that only 74 tons of hay are cured for the use of 8,994 farm animals—a surfeit of 16 pounds to each animal for the winter. This certainly does not indicate a poverty of pasturage, or extreme severity of weather or depth of snows. Again, there is produced $30,879 from slaughtered animals, about two dollars per acre for the entire area of improved lands, exclusive of forests, in addition to other farm products.

Cabell county, on the Ohio river, is intersected by the Guyandotte river, has more improved lands than Boone; this degree of improvement, small as it is, with somewhat better facilities for transportation, makes the assessed va of farms about ten dollars per acre. It has some fertile lands; is a fine re for fruit, and already derives some revenue from orchards; grows sorgh finely, sweet potatoes, &c. This county is also very rich in minerals.

Wayne county occupies the southwest corner of the State, and is sepa from Kentucky by Sandy river. The surface is much broken, well cove with valuable timber, affording some excellent soil; and the earth beneath i rich with a variety of coals, including cannel. It is here that the enterprise of Eli Thayer was inaugurated, at Ceredo, which terminated in failure from ca having no connexion with the intrinsic value of the resources there ready fo development.

Logan, Wyoming, and McDowell are drained by the tributaries of the Sandy and by the Guyandotte, and occupy the extreme south of West Virginia. T region is rough, but fertile, rich in woods and mines, scarcely available or va able at present for want of water or other cheap transportation. It is immedi ately valuable, however—aside from the close proximity of rebel territory the danger of rebel marauding—for wool-growing. Lying between the latitu of 37° and 38°, on the same parallel with the southern point of Illinois, and ye elevated above miasmatic influences—a country of genial sunshine and bracin air, of trout brooks and running streams—it is eminently a fit and healthfu locality for sheep. Ample pasturage for extensive flocks is afforded in th openings of the forest, in which nutritious grasses spring up spontaneously, an grow vigorously. A commencement has been made, and this district, of eigh counties, unsettled as it is, and comparatively unpeopled, had, in 1860, 36,98 sheep, producing 65,183 pounds of wool. This does not fairly exhibit the wool producing ability of the region, as the sheep, roaming in the forests, are lit cared for, and lose much of their wool upon bushes and briers when wa

s, and the proper shearing time is neglected or delayed. It is by all acquainted with this section that the cost of keeping sheep ıy nominal, and their growth and condition as favorable to profit as d.

THE CENTRAL COUNTIES.

ed the borders of the State, let the reader glance at the broad the interior counties, which are drained by the Monongahela s, the Little Kanawha, the Elk, and the Gauley, with numerous s, which mingle with the waters of the Ohio or the Kanawha. re the prices of lands are yet reasonable; that general agriculture s to be most remunerative; that improvement is rife; and here, too, e of coal and iron and coal oil is found in addition to the wealth of e. The capital of the State must be located here; the Baltimore road cuts this section in two directions, and a road cutting the udinally is already contemplated, and its commencement and com- not be far in the future.

su ce of this section is varied. Like most of the State it is uneven, n, and declivitous, in different localities, with a small per-centage ttom lands and smaller still of level uplands. The soil is good, turally into grass, and yielding all farm products well. The northern the hills contain more of humus than the southern, and produce most corn, while the southern slopes are stiffer and more tenacious, as though y denuded of vegetable mould by washing, by some old-time abrasion, r cause, and therefore suited best to wheat culture.

e items relative to this section have been kindly furnished by J. H. Diss of St. Clara Colony, Doddridge county, commissioner of emigra- West Virginia, who has enjoyed the advantages of years of close and ent observation and experience. This colony is itself an illustration of unerative character of agricultural effort and industry expended upon nds. In a few years a few straggling pioneers have given place to fifty families; and Irish and German immigrants, with means enough to a plough and a single cow, have been able to stock and pay for their nd live in peace and plenty. The following extracts show the price and er of farm lands in this district:

main valleys of the west fork of Tygart's Valley river, both being branches of the ahela, and to some extent the valleys of both Kanawhas, contain bottom lands equal y, though not in breadth, to those of the Ohio, and on the former stream, in the of Lewis, Barbour, Upshur, Harrison, Taylor, Marion, and Monongalia, the hills instances rise from the valleys in more gentle slopes, and present a greater and supe- le surface than those along the Ohio river. Farms in those counties, with about timbered land, range from $25 to $50 per acre, and are amply worth it.

he smaller valleys of tributary streams the price of farms in the above named coun- ilarly proportioned as to cleared and unimproved land, vary from $15 to $25 per d further towards the heads of streams, and more remote from thoroughfares, from ver acre.

ms, chiefly hill land, but all fit for grazing and sufficiently watered, with prim- provements, can yet be had at from $5 to $10 per acre, with twenty to twenty- a hundred, more or less, prepared for cultivation.

tracts of wild land are not found in any of the above named counties, except in Lew , where timbered mountains, containing some table land fit for small grains b t at from $2 to $4 per acre. In the other counties very little tim plough, can be bought for less that $5 or $6 per acre, and some of

Wirt, Ritchie, Doddridge, Roane, Calhoun, Gilmer, and Braxton, are presenting extensive bottoms, but contain very little land absolutely of these counties varies from undulating or rolling to hilly, and the hill may be safely set down as from five to fifteen per cent. As a the same quality are rated lower in the latter than in the first named their inferior state of improvement.

"Farms with about thirty per cent. cleared can be bought here for $6 to $10 per cording to quality or proximity to market or roads. Wild lands, in lots to suit pu from $2 to $8 per acre. Lands near the Northwestern Branch railroad bring compara high prices, in part from the value of the timber, which is generally of superior gro quality. Mineral lands are higher.

"A correct statement of the average amount of grain produced per acre, in county of the State, would not give an accurate estimate of the producing cap soil, because on all recently cleared land, stumps, roots, and loose stones on the s also the vermin of the adjacent forest, materially contribute to diminish the yield pected from the quality of the soil; while on the other hand there is a wide differenc fessional skill and industry among our farmers. We have still among us a goodly nu of the old hunter pioneers, or of their immediate descendants, who are content to live from hand to mouth, and never used any other plough but the one-horse shovel.

"The bottoms of rivers, with few exceptions, yield. under good cultivation, from one hundred bushels of corn, and an average of about twenty bushels of wheat, from to thirty-five of rye and oats, one hundred and fifty to two hundred bushels potat from two to two and a half tons of timothy hay. Turnips sown on fresh cleared land, scarred by the shovel-plough, have been known to produce near 800 per acre. Tobacco, new-made land, also proves to be very remunerative, and certainly grows most luxuriantly, though I have not at hand any figures under this head to show cash results.

"Hillside lands of the same quality of those bottoms, except in depth, must naturally yield less on account of their unadaptedness to the same thorough cultivation, and also because of the diminished number of plants growing on declivities, yet a great portion of those lands, when lying towards the sun, produce for many years in succession from fifty to sixty bushels of corn, and other grain in proportion. In the yield of grass, this difference is not so sensible, and rolling or steep lands are generally sown in grass after two or three grain crops and devoted to grazing.

"The yield of wheat, which does not average over thirteen or fifteen bushels per acre in the rougher portions of the State, would be greater if its cultivation was confined to limestone land or to dry upland or table land. As it is, wheat is sown there on rich porous soil, in order to get in sod, the grass seed being generally sown with it, and on such soil, particularly on hill-sides, and when put in late after cutting up the corn, wheat is exposed to freeze out during a severe winter.

"When devoted to grazing and in good sod, more or less mixed with blue grass, which comes up spontaneously on limestone land and old grazed pastures, from two and one-half to three acres are allowed for the fattening of a three-year-old steer per season, say from 1st of April to middle or end of August, and the weight thus gained by the animal is estimated at a minimum of $10, ranging from that to $15, while the latter figure is realized on many cattle grazed from March till June only, when properly cared for during the preceding winter."

The grain produced is uniformly consumed upon the farms, with few exceptions, in localities favored by river transportation with good facilities for reaching good markets and high prices. Feeding surplus grain to stock is wisely preferred to selling it, not only because it thus transports itself to the railroad and a market almost without trouble or expense, but because a large per-centage of its value is returned to the soil as manure, furnishing one of the surest, feasible, and valuable modes of fertilization known. This mode of manuring must ever commend itself to West Virginia, with its uneven surface and liability to wash, which will tend to increase with increasing thoroughness in pulverization. It is fair to say, however, that the excessive liability to wash exists in some soils does not characterize those under consideration. The rearing and fattening of stock is destined to be the principal business of the farmer, as is the most profitable everywhere—a fact attested by the dependence placed upon it in England for paying the high rents of that country. The yield of the cereals is equal to the average throughout the west, but they are less remunerative than hay and grass, except in very rare instances of accidental fluctuations in price.

Mr. Debar refers to numerous instances in his knowledge in which the fertility of the soil has been tested by annual products for fifteen years of 50 to 75 bushels of corn per acre, without manure; then, after clover two or three years, and ploughing ten or twelve inches deep, and one good crop of wheat, has yielded from two to two and a half tons of hay per acre.

West Virginia, in fine, though particularly adapted to meat and wool producing, dairying and fruit-growing, is suited to the production of almost e

to the temperate zone, while, in certain grades and mountain
at, oats, potatoes, and grass are the main reliance; yet through-
entire area the soil is well adapted to corn, wheat, oats, buck-
roots, hemp, flax, tobacco, sugar-cane, fruits, and grasses.
ounty lies upon the Pennsylvania line. Laurel ridge rises on its
a the Monongahela and Cheat rivers intersect it. The county
own. Among its exports are cattle, lumber, flour, and iron,
ed both by railroad and steamboat. It is an enterprising,
proving section of the State.

next county south, is also drained by the Monongahela, formed
confl ce of Tygart's Valley and West Fork rivers. It is a small
n in c and iron, with abundant water-power, magnificent forests,
l . Fairmont, a pleasant village on both railroad and river,
a

is a very small county, embracing an area less than that of four
of government surveys, and formed from Harrison, Barbour, and
it is prominent as the point at which the Baltimore and Ohio railroad
to Wheeling and Parkersburg. To the traveller its surroundings
ne, but very forbidding in the eye of the prairie farmer wandering
it has a population of only 7,463, yet its railway facilities have
valuation something like its intrinsic worth, the average of farms
y $16 01 per acre. Among these mountains grow yearly 78,001
f corn, 80,357 pounds of butter are produced, and 3,160 tons of hay
, and animals are slaughtered to the value of $22,383.

ur county lies further up Tygart's Valley river, and is also drained by
n river and Elk creek. Philippa, famed as the opening scene of the
rebellion in the State of Virginia, is the county seat. Its assessed
verages scarcely half as much as that of Taylor, simply because it
vored in facilities for transportation. The fertility of its soil is well
by 197,450 bushels of corn, and $377,693 value of live stock, $53,452
slaughtered animals, and large figures generally for farm products,
d with reference to its population of only 8,958.

g the west fork of the Monongahela, the reader will come to Harrison
f which Clarksburg is the principal town, situated upon the north-
Virginia railroad, a branch of the Baltimore and Ohio. It possesses a
soil, fertile and durable. It is perhaps the most improved of the
unties, and has a farm valuation of $4,642,794, exceeded only by that
r and Jefferson. The value of its live stock is $644,325, exceeded
ampshire and Greenbrier. With such figures, the value of slaugh-
mals, $75,883, will not be deemed extraordinary. In corn, of which
ct is 320,946 bushels, it is exceeded only by Hampshire and Jackson.
rg is the seat of a fine trade in coal.

is immediately south of Harrison, higher up on the same stream; pro-
tons of hay, considerable quantities of grain, possesses excellent
many good and productive farms.

is another railroad county west of Harrison. Its staples are also
s. Cattle thrive for six months of the year with no other pastur-
ge of the forests. Nutritious grasses spring naturally wherever
enuded of timber. Its proportion of improved to unimproved
14 acres to 217,543; its average valuation, by the census of 1860,

, xt east of Jackson, upon the railroad, has a variety of
n into very abrupt ridges in places, exhibiting in dislo-
of violent upheaval; the soil, too, is variable, but gener-
is was named in honor of Thomas Ritchie, editor of the
r. It is drained by the Hughes river. But a small portion

of farm lands are as yet improved. It is in the midst of the oil for which extends south from western Pennsylvania in a nearly straight line the Kanawha. The famous lubricating oil, used by the Baltimore and railroad, is pumped from shallow wells near Petroleum, 22 miles from Pa burg.

Upon Oil Run, a little valley winding through rocky hills, whose ranged strata dip in every direction, at every angle of inclination, may a marvel of nature and a curiosity of industry—the Virginia oil works— by a company of which John Handlan, a prominent business man of W ing, is managing agent and one of the proprietors. The works are l two miles north of the northwestern Virginia railroad, very nearly in a north and south line with the oil springs of Wirt county and of western P sylvania.

The oil is the heaviest known in the country, almost destitute of l and naphtha, and a superior lubricator. The Baltimore and Ohio railroad u as the best lubricating oil attainable, about one hundred barrels per month.

Eleven wells were working at the date of the writer's visit, all operated a rude but effective as well as novel system of mechanism, driven by single engine of fifteen horse-power, with ample power to spare for the wo ing of many more wells. It is called a "telegraph," its continuous l rough scantling, suspended by iron hangers between duplicate telegraph poles, being somewhat suggestive of such a name. The entire system, necting the different wells throughout the narrow valley and in the ra that make into it, requires more than half a mile in length of this telegraph and is operated by an alternating horizontal motion—forward perhaps tw inches and back the same—which keeps in continuous action all of pumps at the same time. A dirty, greenish stream flows forth, and is l in troughs to large wooden reservoirs, with stop-cocks near the top for dra ing off the oil, and at the bottom for discharging the water. Nearly all t labor required is in running the engine and obtaining fuel for it, boring we making fixtures, and barrelling the oil. The oil is brought from the rec of the earth, separated from the water, and conveyed to the barrellers a lutely without manual labor.

The wells are from 28 to 200 feet deep, the shallowest producing the hea iest and best lubricating oil; but Mr. Handlan is now engaged in boring de wells, thus far with very good success.

Wirt county, south and west of Ritchie, is in the second tier of coun from the Ohio, upon the Little Kanawha. It is also declivitous and oil-yield and is the location of the oldest and most extensive system of oil wells to found in the State. Their discovery was attended with much excitement, a the proprietors of the soil are deriving immense revenues as rental, and t operators are variously meeting with returns ranging from the fullest succe to the most decided failure. Some wells are improving, others failing, a after temporary suspension are again worked. A singular geological phen enon of the oil region has attracted attention in this vicinity. A soft black su stance, resembling coal, inflammable and soluble, a kind of solidified petroleu fills a chasm between vertical strata, from four to six feet in width. How it extends vertically it is impossible to say. The business of extracting from it would long since have been undertaken, but that the pure oil, in i mense quantities, possibly resulting from precisely similar fissures, has spout forth by thousands of barrels, almost without the aid of man, in its immed vicinity. (See description of these works in another part of this volume.)

A large portion of its land is unimproved, but naturally productive; assessed value averages $5 11. Its crop statistics show an average yield farm products.

Calhoun is a small county, also intersected by the Little Kanawha, conta

s fertility, assessed at nearly the same value as those of
oc ieu mainly for the rearing of live stock.
ns Calhoun on the east, is drained by the Little Kanawha and
fine forest ranges for cattle, and a comparatively small area

of Calhoun, abounds in steep hills and grassy valleys, through
rs of the Pocotalico and other streams, tributaries of the
it is a fine region for cattle and sheep, and unwillingly fur-
nd dollars' worth of horses for the cavalry of the rebels. The
) was rapidly increasing in 1862; but the raiders having a
mutton, it is presumed that losses and gains have left the flocks
in 1860. Tobacco does well in this as in the adjoining counties,
product that commands a fine price for its excellent flavor. In one
season twenty-one acres, with indifferent culture, brought $2,000.
results can be attained with so little labor on lands which average
dollars per acre, it should not be said that the soil here is unpro-
farming unprofitable. Fruit is usually abundant. Good peach crops
enjoyed for a succession of years past. The fruit is often sold at
bushel.

e of the adaptation of this soil to tobacco, a statement of a cor-
y be referred to relative to the crop of a neighbor, Martin W.
this county. The land was in forest, and cost to clear twenty acres
rate the crop $1,100, and $153 more to get it to market. Though
onsiderable of it for want of sheds sufficient to cure it properly, he
0 pounds for $2,674. This gave a profit of $1,421, or $71 05 per
ly sufficient to buy a large farm of unimproved land.

county is more nearly than any other the geographical centre of
It is intersected by Elk, Little Kanawha, and Holly rivers, and
It is well watered and fertile. Little more than an eighth of the
s are improved. Average assessed valuation $4 28. This is very
parison with their intrinsic value. It is midway between Clarks-
Charleston, and on the line of the proposed central railroad route.
the county seat.

r county, drained by the headwaters of the Elk and Gauley rivers,
ounty, with resources very little developed and lands cheap—aver-
61 per acre.

s, upon the south, intersected by the Gauley, has a promising future.
1,460,228 acres of farm lands, of which but 34,941 are improved;
uation $2 51 per acre. It has clear, running streams, filled with
trout, and fine forest pastures and grassy glades. Though only
per cent. of its farm lands are improved, its live stock is valued
, its flocks of sheep numbering 9,093; and while it lies well up
mountains, there is required for the winter support of 20,536 farm
2,035 tons of hay. Winters cannot be very severe if 100 pounds
ice for each animal.

ty lies south of Braxton, upon the Elk river. It is a small county.
,065 acres of improved land. Its location is eligible, and much of
oductive.

STATISTICS OF PRODUCTION.*

of the farm products of West Virginia will not indicate an ex-
uction in proportion to population, nor will it show so meagre

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s chapter, as well as those interspersed in descriptions of the several
the census returns of 1860. Returns made to the State Auditor, if
late, would show advancement in many of the counties even during

a result as most people in other States would have predicted. In view fact that a large element of the population has been that of the forerun civilization, the pioneer, who desires nothing more than elbow-ro wide forest range for game, and is content to lead a primitive life, i few wants and those easily supplied, these figures prove incontestably t soil.

A statement of the farm products, &c., of West Virginia, compiled census returns for 1860, *by permission of Commissioner Kenne*

Acres of improved land	2,3
Acres of unimproved land	8,5
Cash value of farms	$87,5
Value of farming implements and machinery	$1,9
Horses	
Asses and mules	
Milch cows	1
Working oxen	
Other cattle	1
Sheep	4
Swine	3
Value of live stock	$12,3
Wheat, bushels of	2,3
Rye, bushels of	
Indian corn, bushels of	7,8
Oats, bushels of	1,6
Rice, pounds of	
Tobacco, pounds of	2,1
Ginned cotton, bales of, 400 pounds each	
Wool, pounds of	1,0
Peas and beans, bushels of	
Irish potatoes, bushels of	7
Sweet potatoes, bushels of	
Barley, bushels of	
Buckwheat, bushels of	3
Value of orchard products, in dollars	$2
Wine, gallons of	
Value of produce of market gardens	$
Butter, pounds of	4,7
Cheese, pounds of	1
Hay, tons of	1
Clover-seed, bushels of	
Grass-seeds, bushels of	
Hops, pounds of	
Hemp, dew-rotted, tons of	
Hemp, water-rotted, tons of	
Other prepared hemp	
Flax, pounds of	1
Flax-seed, bushels of	
Silk cocoons, pounds of	
Maple sugar, pounds of	6
Maple molasses, gallons of	
Sorghum molasses, gallons of	1
Beeswax, pounds of	
Honey, pounds of	4
Value of home-made manufactures	$5
Value of animals slaughtered	$2,1

erson, Berkeley, Mason, Hampshire.
all, Monongalia, Greenbrier, Preston.
o, Brooke, Hancock.
Hampshire, Pendleton, Marshall.
hontas, Hampshire, Marion, Monongalia, Berkeley.
, Hampshire, Berkeley, Barbour, Monongalia, Jefferson, Marion.
nam, Kanawha, Mercer, Wood, Monroe, Fayette.
s, Upshur, Mercer, Barbour, Logan, Marion.
ison, Upshur, Preston, Barbour, Monroe, Marion.
rshall, Preston, Hampshire, Wood, Jackson, Jefferson.

Statement of the number and value of different kinds of live stock, as the United States census of 1860.

Counties.	Horses.	Asses and mules.	Milch cows.	Working oxen.	Other cattle.	Sheep.	Swine.
Barbour	3,059	81	3,726	418	7,715	11,673	8
Berkeley	3,510	19	2,728	12	3,687	7,057	13,4
Boone	787	9	1,444	428	3,078	3,248	7,653
Braxton	976	19	1,395	197	1,826	6,108	5,040
Brooke	1,399	18	1,319	169	1,513	40,630	3,309
Cabell	1,350	66	1,475	856	3,780	5,764	8,408
Calhoun	484	10	741	242	1,491	2,412	2,956
Clay	286	10	538	150	637	1,608	2,412
Doddridge	1,182	2	1,664	232	3,147	5,377	4,332
Fayette	1,266	20	1,767	471	2,467	6,998	7,723
Gilmer	815	8	1,197	205	2,392	3,967	3,864
Greenbrier	3,714	128	3,984	686	8,163	16,067	10,971
Hampshire	5,222	27	5,522	6	11,355	21,287	14,619
Hancock	1,109	4	1,127	140	1,657	21,402	2,465
Hardy	2,526	54	2,561	142	8,244	11,378	7,032
Harrison	4,404	35	4,501	681	12,163	13,202	11,496
Jackson	1,330	23	1,541	504	2,513	6,615	6,538
Jefferson	3,421	128	2,316	135	4,071	7,269	15,044
Kanawha	1,402	153	1,889	1,047	3,282	4,936	10,135
Lewis	1,617	12	1,902	364	5,452	8,250	4,554
Logan	885	23	1,595	827	3,513	4,673	9,197
Marion	3,762	54	4,629	654	5,680	9,029	9,985
Marshall	2,413	2	2,501	573	3,113	10,022	8,447
Mason	1,355	75	1,254	616	3,266	5,582	8,294
Mercer	1,552	37	2,218	199	4,128	10,225	11,308
Monongalia	3,904	32	3,881	680	7,090	10,945	8,028
Monroe	3,216	47	3,058	407	9,181	12,988	10,172
Morgan	972	6	1,036	16	1,709	2,992	3,300
McDowell	222	8	573	25	785	866	2,463
Nicholas	1,358	52	1,728	505	4,523	9,093	12,390
Ohio	1,441	3	1,408	246	1,380	40,050	3,244
Pendleton	2,543	1	3,423	11	6,372	14,143	5,744
Pocahontas	1,688	53	2,447	246	5,471	10,338	5,099
Preston	3,326	41	4,993	591	5,846	19,084	8,854
Putnam	1,229	114	1,507	924	2,891	5,924	8,084
Pleasants	646	1	725	211	1,300	2,837	2,386
Raleigh	486	5	744	128	1,311	3,569	3,663
Randolph	1,189	17	1,760	237	6,106	7,565	3,267
Ritchie	1,724	36	2,117	392	3,409	7,925	7,891
Roane	783	26	1,011	247	1,625	5,190	4,380
Taylor	1,137	30	1,347	219	2,721	4,788	3,710
Tucker	448	6	536	78	1,337	2,651	1,291
Tyler	1,484	20	1,644	476	2,829	8,748	5,942
Upshur	1,955	5	2,508	305	4,690	9,821	5,078
Wayne	1,240	113	1,524	1,297	2,642	7,405	8,898
Webster	356	2	693	89	972	2,474	1,691
Wetzel	1,502	4	1,806	365	3,056	6,244	6,293
Wirt	874	14	1,086	310	1,589	5,032	4,[illegible]
Wood	1,899	6	2,197	6[illegible]8	2,706	7,360	7,[illegible]
Wyoming	414	15	868	99	2,365	1,233	4,733
	85,869	1,674	100,154	18,696	191,239	453,334	327,214

riter has endeavored to procure more recent returns from the office of
e auditor of West Virginia, and has succeeded in obtaining a partial
f the condition of live stock; but the southern and southwestern and
the mountain counties have been so infested with guerillas and in so
l a condition that the statement would be too partial and incomplete to
factory.

me counties great losses have been incurred in live stock from maraud-
ticularly in horses. Yet the State returns for 1862 give an increase in
over 1860, in the counties of Barbour, Brooke, Cabell, Doddridge, Har-
lancock, Jackson, Kanawha, Lewis, Monongalia, Marshall, Ohio, Preston,
eral others. In some cases this increase is extraordinary, as in Kana-
om 1,402 to 5,222, doubtless due to a great influx from Fayette and
rier, on the great highway to rebeldom, and from which there is no
The same disturbing causes have affected other stock to some extent.
had already increased, in 1862, in Brooke, from 40,620 to 46,200; in
k, from 21,402 to 29,932; in Harrison, from 13,202 to 17,991; in Mo-
a. from 10,945 to 17,594; in Marshall, from 16,022 to 22,197; in Pres-
n 19,084 to 25,980. Since that date there has been a still heavier
e.

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et exhibiting the quantity and value of some of the principal items of farm produce, according to the census of 1860.

...ties.	Wheat.	Rye.	Indian corn.	Oats.	Tobacco.	Irish potatoes.	Butter.	Slaught'd animals.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Pounds.*	*Bushels.*	*Pounds.*	*Value.*
.....	37,835	4,794	197,460	29,680	596	17,256	161,627	$53,452
.....	237,576	18,672	275,525	76,176	.....	18,962	180,069	93,555
.....	15,278	1,118	143,808	7,994	18,729	10,620	59,262	30,879
.....	22,366	604	122,749	17,635	15,534	8,300	43,772	20,327
.....	23,490	3,506	142,122	64,984	.....	20,488	140,326	36,763
.....	65,715	356	248,210	18,717	62,578	11,119	45,230	49,736
.....	10,734	56	69,847	6,423	7,882	6,088	61,050	13,453
.....	4,433	419	44,310	6,150	26,229	4,269	27,868	12,597
.....	16,514	569	124,133	6,765	7,025	13,724	66,554	24,843
.....	25,693	2,463	131,425	28,433	127,713	10,223	89,082	44,167
.....	18,609	168	126,944	11,800	61,104	7,836	77,274	21,167
.....	52,017	10,610	231,479	112,055	3,000	24,858	151,156	114,205
.....	196,310	75,257	375,090	49,259	75	41,773	239,360	109,834
.....	16,423	5,117	61,346	46,716	.....	26,002	125,446	26,396
.....	39,946	28,043	286,618	29,200	1,450	18,534	102,603	71,698
.....	55,411	936	329,946	37,501	11,715	15,357	155,419	75,883
.....	88,338	228	219,377	11,878	74,691	32,630	111,506	40,260
.....	422,514	15,198	358,267	54,798	6,700	31,876	131,684	110,221
.....	76,305	198	274,943	45,430	338,264	12,352	59,196	56,345
.....	27,191	579	136,677	12,418	82,910	9,822	66,230	28,817
.....	11,025	330	199,385	11,067	13,545	9,794	48,247	30,559
.....	50,894	1,150	214,706	86,409	25,012	12,618	226,852	55,990
.....	74,759	2,830	241,911	133,617	10,590	46,634	146,715	44,944
.....	102,859	330	264,813	6,462	21,996	11,873	67,337	55,706
.....	43,131	5,021	131,654	55,843	182,554	10,533	81,454	58,132
.....	49,134	4,399	229,024	126,198	1,380	10,586	171,876	46,994
.....	81,805	13,432	216,513	59,265	132,019	12,692	112,753	78,506
.....	19,404	16,082	47,575	10,122	2,234	7,806	61,152	21,325
.....	1,041	285	20,445	2,215	1,275	1,410	6,407	8,138
.....	12,894	6,128	103,193	26,613	14,470	16,528	110,453	64,227

Statement exhibiting the quantity and value of farm produce, &c.—Conti

Counties.	Wheat.	Rye.	Indian corn.	Oats.	Tobacco.	Irish potatoes.	Butter.	Sh a
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Pounds.*	*Bushels.*	*Pounds.*	
Ohio	20,048	5,639	138,430	82,101	.....	21,449	128,448	
Pendleton	11,475	11,927	122,997	16,516	2,073	13,366	101,838	
Pocahontas	8,774	9,787	48,229	26,612	190	12,090	121,310	
Preston	8,933	10,778	71,063	104,317	185	44,655	340,988	
Putnam	78,796	43	197,700	16,355	406,992	9,192	81,940	
Pleasants	22,785	319	102,172	7,395	27,930	7,747	30,500	
Raleigh	6,700	1,825	39,301	11,713	34,827	3,719	22,644	
Randolph	7,675	2,126	56,225	20,248	1,117	8,349	57,332	
Ritchie	27,582	369	147,785	14,978	18,606	19,490	92,337	
Roane	21,897	705	100,074	8,743	10,268	6,593	44,116	
Taylor	20,811	898	78,001	25,610	3,139	4,294	80,357	
Tucker	1,103	1,147	19,955	6,049	710	4,346	17,057	
Tyler	43,727	283	182,239	28,512	11,225	23,733	130,527	
Upshur	27,765	1,719	149,496	20,337	50,000	13,639	126,350	
Wayne	35,319	362	224,044	13,077	55,628	8,898	71,514	
Webster	1,586	791	25,602	3,100	.....	2,194	11,587	
Wetzel	31,652	1,529	180,150	26,775	84,989	14,430	124,342	
Wirt	27,488	202	115,046	5,096	44,074	8,769	41,602	
Wood	74,236	244	227,223	19,158	166,365	33,166	12,175	
Wyoming	5,601	962	62,420	9,515	4,778	4,024	22,855	
	2,302,567	71,263	7,858,647	1,649,090	2,180,316	746,606	4,760,779	2,

MINERALS.

Whatever may be said of the capacity of this new mountain State fo eral agricultural industry, or for the special rural enterprises of so muc mise as fruit-growing, wine-making, dairying, or wool production, it can denied that untold wealth is awaiting development in the hillsides, up river banks, and in their beds, and deep in the bowels of the earth. A the minerals may be named coal, iron, lead, copper, silver, antimony, n borax, soda, alum, salt, lime, petroleum, and fire-clay. The denuding surface by water or other agencies, and its excavation in deep and som precipitous ravines, through which its drainage is secured, lays bare the s strata of rocks and minerals, brings to view the hidden treasures of the and renders mining easy, and facilitates the removal and distant transpo of the precious deposits sought.

A word or two, at the outset, should be bestowed on the great variety a markable character of

MINERAL SPRINGS.

Mineral waters, in remarkable variety, exist in all portions of the valle others still more noted and valuable are scattered among the mountain gl Greenbrier county. These, with those in Berkeley, are in West Vi There are thermal, saline, carbonated, and sulphuretted waters, acidulous impregnated with carbonic acid, in some instances combining gas equal t half of the amount of the water itself. Sulphur, iron, lime, magnesia, an elements, variously mingled, give these waters their peculiar characteris color, taste, and medicinal effect. Professor William B. Rogers, former geologist, thus refers to them: "Viewed singly, in relation to the numb riety, and high reputation of its mineral waters, this region is well entit be proud of the vast resources of which it is possessed. Grouped, as

moderate distances apart, presenting within the same district a
icinal character, for which, in other countries, regions remote
require to be visited in succession, placed at a point equally
the inhabitants of the seaboard and the great valley of the west,
in region of grateful summer temperature, of salubrious climate,
ue and diversified natural beauties, they are now rapidly at-
ty for powerful and varied remedial qualities, as well as for the
oyments which are annually gathered around them, destined
ipse the older reputation of the famed fountains of the northern
to vie even with the long-established character of the most noted of
g places of the Old World."

TRAVERTINE.

rson county, and in all portions of the valley to a greater or less ex-
a deposit of marl, in beds of considerable thickness. It is found in
nearly all the streams, being formed by a precipitation of calcareous
m the limestone waters. It is known to geologists as travertine.
very pure lime is obtained, commanding a high price in the market,
due to agriculture, from its general diffusion and attainment without
of quarrying, is not liable to undue appreciation. Much of it is ob-
state so friable that it may be applied, as it is in Europe, directly to.
ke marl, obviating the expense of burning. Calcareous manures have
incalculable benefit to eastern Virginia, and have been applied with
the calcareous soils of the valley. Each section of country, in all the
natural elements of fertility which, with skilled husbandry, in co-
with the ameliorations resulting from stock-growing, are ample for all
nds of high culture. This chalky deposit is only one of many ele-
fertility existing in Virginia.

LIMESTONE.

ineral is generally diffused throughout the State. The valley counties
y of a limestone formation, interspersed with layers of slate. The
pass at Greenbrier exhibits everywhere limestone, interspersed with
shales. Throughout the mountain region, and everywhere among
and coal deposits, abundance of limestone is found. In the lower
, below Charleston, arenaceous and argillaceous rocks are presented,
layers of limestone of different degrees of purity, in some cases con-
fficient alumina to give it a hydraulic character. Interposed between
oal, thick beds of limestone occur on the Ohio river at Wheeling and
Associated with the coals of the Monongahela and Tygart's valley
branches are beds of limestone and sandstone, both increasing in
as the coal diminishes. There is little lack of this material, so
o agriculture, iron-working, and the building arts.

from Patterson's creek, in Hampshire, are of grayish drab color,
ture, moderately fine grain, structure slaty, bearing 93 per cent. of
of lime.

y Creek mountain, near the blue sulphur spring, of a light gray
grain, containing 98 per cent.

side of Laurel Hill, in Monongalia county, of a light yellow and
y sub-crystalline, 90 per cent.

s river, in Preston county, light gray, with blue stripes, 68

in Randolph county, of light gray color and compact tex-

rn, in Monongalia, dove-colored and sub-crystalline, and
cent. carbonate of lime, 19 per cent. magnesia, and 9·

A great variety exists in quality, color, and texture. Hydraulic lime is very abundant in Ohio, Harrison, Preston, Monongalia, Hampshire, other counties, and in the Kanawha valley.

SALT.

The saline formation has been little explored, except in Mason and counties. It is associated with the vast strata of sandstone that under whole of this section and the southwestern counties of Virginia, in so which large quantities of salt have of late been manufactured in the in the rebellion. The inference has been deemed reasonable, from the western of the white sandstone from which the Kanawha brine is obtained, t might be reached in the mountains up the river much nearer the surface; salt has actually been manufactured upon New and Greenbrier rivers, l comparatively little success as yet.

The works on the Kanawha, a few miles above Charleston, are exte ve productive. The wells are several hundred feet in depth, yielding a p remarkable purity, almost absolutely free from sulphate of lime or gy therefore evaporated and crystallized with fewer difficulties than usual, brought to market as muriate of soda of nearly absolute chemical purity. specimen received from General Lewis Ruffner, of the Kanawha salin be seen at the Department of Agriculture. Experience has demonstr superiority of this salt over any other manufactured in the country. cured with it has kept, while that put up with foreign and American under similar circumstances, has spoiled.

Extensive salt works exist in Mason county, making a product of ex quality. The total manufacture of 1865 is stated as follows: Mason C Mining and Manufacturing Company, 8,081,300 pounds; Mason City Company, 8,613,600 pounds; Union Salt Company, 4,553,050 pounds. T 21,247,950 pounds, or nearly a half million bushels.

Immense quantities of coal are annually used in salt-boiling, and milli bushels of salt produced. The Kanawha works have been much interrup since 1861, by rebel incursions and dearth of labor, but last year produced million of bushels.

IRON.

The iron ores of West Virginia are destined to prove prolific sou of wealth when capital shall organize labor for their reduction, and av of communication to commercial centres are somewhat increased. Fu exist in the valley and in Preston county, and possibly other sections o State. The ores are hematites of various aspects, many of them yielding high per-centage of metal of the finest character.

The ores of Laurel Hill have long been worked. They occur in two g upon the western slope, (according to Rogers,) the upper one above the s seam of coal resting upon a lead-colored sandstone, and overlaid by sil slates. The ore occurs in large nodules, variable in size, sometimes grained, but generally coarse, and much resembling sandstones, giving tions of its existence only after burning. Underlying the lowest coal two bands of ore, each about a foot in thickness, separated by shales, and sisting chiefly of the per-oxide of a shaly texture. Next below comes a l of white sandstone; then a bed of ore six or eight inches thick, undecompo a compact proto-carbonate; and lower still among the shales lies another band of ore, underlaid with limestone, from which the flux is obtained for furnaces.

Furnaces have recently been erected in Preston county, which are prod from ore bearing a high per-centage of pure metal large quantities of iron superior quality. The enterprise, it is understood, has been attended w

of pecuniary success. In the Kanawha coal fields there is an deposit of iron ore of good quality.

West Virginia is almost coextensive with its coal, and may be literally throughout the State, and may be worked to advantage ghout the mountain districts.

of ore from the north branch of the Potomac have yielded some 78 per cent.; in Monongahela several specimens from 60 to 93 . Preston county 65, 69, 71, and 82 per cent.

COAL.

al of West Virginia it is useless to attempt a description. It is mense beds in the Panhandle; it crops out at different elevations on f the Monongahela and its numerous branches, away up among their he hills of the Cheat River region are black with seams that are in ten to twelve feet thick of solid coal; small quantities are found in region east of Parkersburg. The coal fields of the Kanawha valley excelled, and perhaps not equalled, in variety and quantity, upon ; while in the eastern slope of the mountains, among the head- Potomac, great deposits of bituminous and semi-bituminous are ly worked.

llowing items relative to coal, from the geological report of Pro- ers, made long since and previous to the opening of many successful ll give a hint merely of the great wealth of these Alleghanian coal

sburg and northward down the valley of the Monongahela, there exists one of coal deposits in the State. One of the seams in some places in the neighborhood a is from ten to twelve feet in thickness, below which, and separated chiefly by l of sandstone, there lies a thinner stratum of a more highly bituminous charac- "We may form some idea of the vast extent of these coal seams from the fact, me distance above Clarksburg they may be followed with scarcely any interrup- ghout the whole length of the valley of the Monongahela down to Pittsburg. Great Kanawha the exposure of coal is one of the most extensive and valuable n the United States.

npshire county, upon a stratum of valuable iron ore not less than fifteen feet in here rests a bed of sandstone, upon which reposes a coal seam three feet thick; another bed of sandstone, then a two-feet vein of coal, then sandstone, then l seam of four feet; again a stratum of sandstone, and over it a seven-feet vein er this a heavy bed of iron ore; and crowning the series, an enormous coal seam sen to twenty feet in thickness."

n H. Smith, United States district attorney, resident in Charleston, t department upon this subject:

hia of West Virginia lies on the western slope of the Cumberland range, and nearly west of it abounds in coal; but in that part of the State on the Great Kanawha aries, Elk and Coal rivers, and on Guyandotte river, coal is found on a mag- . It exists in numerous strata of different thicknesses, rising from the base of the s, all nearly horizontal and slightly dipping to the north. This place is sixty mouth of the river. Here the hills become lofty, and increase in elevation Gauley mountain. Ascending the river a distance of thirty-six miles, coal except the anthracite, is found of superior quality—the cannel, splint, all varieties of each. Geologists and others report, in those thirty-six miles workable strata of good coals, amounting in all to from sixty to one hun- , aggregating the several strata. These strata are severally from three They extend over the whole country for miles, running from creek to to river. They are readily made accessible to the Great Kanawha, Guyan- y rivers." * * * "The amount of coal on the Kanawha and its trib- coal rivers, is incredible. There is nothing equal to it anywhere."

of the Briarport mines, writes thus of the coal in the :

(on, to the northeast and northwest, the strata is nearly level, gentle undulations; they consist of gray, brown, red, and white

sandstone, the latter highly fossiliferous, narrow bands of blue clay slate, beds of clay and sandy shales, thin seams of iron ore, and isolated patches of limestone. Above the s found thin seams of very rich hematite, many stones of which I have found that w up to 60 per cent. in metallic iron; but the prevailing ore is the carbonate of iron the kidney or nodular form, in uneven segregated beds in a strong ferruginous At Davis's creek, about midway between Coal and Kanawha rivers, are two so one of cannel, two of iron, and two of limestone, all within three hundred feet level. The general contour of the country presents a series of narrow mountain r ravines, varying from 300 to 500 feet in height; in these, and all above the water five workable seams of coal, one a very rich bituminous, somewhat friable, two of co splint, and two of cannel, the latter being the uppermost of the series. The bitumin square-jointed seam, is 3 feet 6 inches thick, of rich quality. One splint seam, cal 'twin seam,' is divided into two parts by a parting of argillaceous sandstone 18 inche the entire stratification, or bed, is from 12 to 15 feet; it gives 7 feet of working coal. I places both these beds are merged into one, where the coal is found from 5 to 6 feet The next splint seam is 4 feet, and in working gives about three feet of merchantable The upper cannel seam is 4 feet, and contains about 2 feet 6 inches of pure cannel; it is of a slaty, or partially laminated structure; it is not very good for domestic fuel, but excel gas and oil-making purposes, as also for steamboat uses, as it burns entirely a flame. The second cannel seam varies in thickness from four to six feet, and from two to four feet of fine cannel; it is not always found uniform in character, where perfect it is a hard coal, conchoidal in fracture, very dense, black and clean, b with a bright white flame, is very rich in oil, makes an excellent domestic fuel, partic that part of it called the 'birdseye cannel.' When this coal is used no other light h room is needed, as candles or oil lamps look dim in the glare given off in its c This seam is, however, a very unreliable one; in some estates it is found change or nearly so, into bituminous coal; in others half cannel and half bituminous. I best, or more regular, when imbedded in shales or laminated argillaceous sandstone, much easier wrought. In some mines it is between two hard rocks, without any vein o or shale for a 'bearing in,' which makes it difficult to mine; in this case it is exce hard, and breaks before the pick like a piece of black flint; but the coal is very fine, an at a high price. I believe it is undergoing a state of transition, and eventually would the same relation to common cannel as anthracite does to splint coal. If we take an a yield of the cannel seams, we may compute them safely at 4,000 tons to the acre; some places they are giving over 9,000 tons, in others less than 3,000. The bituminou will average 16,000 tons to the acre over about two-thirds of the surface base of the m tain lands. Cannel coal is now selling on the Ohio at $4 50 per ton, and the best bitum at $2 50 per ton. The mining cost may be put down at $1 50 per ton, average; but would be materially reduced if the mining companies could be persuaded to adopt m improvements in the mode of working the mines. The time, however, has not arrived such can be done, although we are in great hopes another year will not pass without example being set, which when once done efficiently, others will speedily follow. Co cannel selling at the above prices, a good estate, properly wrought, will realize acre, one half nearly being profit."

This description was prepared several years ago for the Mining Journal London. The cannel coal is now worth $12 in Ohio, and the bituminous fr $5 to $7. The cost of mining is also largely increased.

INTERNAL IMPROVEMENTS.

The State of Virginia has undertaken many enterprises, and expended money, obtained by general taxation, for the construction of roads and the provement of rivers; but that portion of the State now constituting W ginia has shared little in those benefits. Her interests have been igno mineral treasures left inaccessible, her farm products isolated from Some State improvements in this quarter were, at times, feebly silence the rising murmurs of popular discontent, and partially comple wholly abandoned at the caprice of the State oligarchy.

ROADS.

The neighborhood roads, in a sparsely-settled and hilly country, cannot course, be in a high state of improvement; yet much labor has been exp upon them, and many of them are in favorable seasons quite passable thor fares, and some are in excellent condition. Since the existence of the State organization, a thorough and stringent law has been enacted relati

uction and working of roads, which is expected to answer all the
nts of a most effective system, and secure convenient means of local
ation.

ous turnpikes add to the facilities for travel in all the more densely-
ortions of the State. Parkersburg has long been connected with
, and also with Winchester, in the valley east of the Alleghanies, by
routes; and there has also been maintained a daily stage line between
s, at the mouth of the river of that name, and Covington, *via*
and the White Sulphur Springs. These were all long lines, and
considerable capital and enterprise in their management and main-

IMPROVEMENT OF RIVERS.

Monongahela is navigated by steamboats in a good stage of water to
t, in Marion county. Slackwater improvements have been made
at intervals through its entire course to Pittsburg. It has proved of
benefit to the adjacent population in affording facilities for transporta-
ron from the furnaces in the vicinity of the river, coal from its banks,
luce of the farmers, and supplies of the merchants.

Great Kanawha is navigable to the falls near the mouth of Gauley river,
ce of nearly one hundred miles. Millions of bushels of salt, immense
of coal, and large quantities of merchandise, have thus found a market,
arge passenger trade has been accommodated. Like the upper Ohio,
r sometimes has its navigation obstructed; in the summer only steamers
draught can ply; but, with a little deepening and clearing of the
, it may be made entirely navigable at all seasons. Some dredging has
casionally done, and slight improvements in its navigation effected, but
has generally been placed on the ordinary natural facilities afforded
stream itself. The fact that through this avenue cannel and other coals,
nited quantities, can be obtained for the markets down the river with
ndred miles less of transportation than from Pittsburg, should stimulate
it in this direction, and aid in developing the magnificent coal
or the Great Kanawha.

Guyandotte river has enjoyed slack-water navigation to a certain extent.
were built, but no very substantial or permanent works constructed.
ave fallen into neglect, especially since the commencement of the war,
now nearly if not entirely useless.

Little Kanawha could easily be made navigable for a distance sufficient
considerably to the convenience and wealth of the communities in prox-
it, and the wants of the oil region will soon, without doubt, accomplish
lly the improvement. In a good stage of water the oil is now either
down in bulk, or floated in barrels, in large quantities, to Parkersburg.
s of barrels filled with oil present a novel and peculiar aspect of river
on.

RAILROADS.

ltimore and Ohio railroad, with its branches, furnishes the only railway
oyed by West Virginia, with one small exception. It is to the en-
invincible determination of this company, and not to aid from the
rginia, that the partial development of the resources of the northern
f the new State is due.

uction of this road was commenced on the fourth of July, 1828;
d to Ellicott's Mills, twelve miles from Baltimore, May 22, 1830;
to Washington was celebrated in August, 1834. Westward
p hed for many weary years, through and over moun-
abysses and over wide rivers, moving now with celerity
evel glades, and then with a progress labored and slow,

boring through the solid rock, until at last the waters of the Ohio and o
the Chesapeake were united, the Alleghanies were surmounted, and shrill p
to the triumph of steam in intercontinental transportation were screamed by
thousand iron throats from the seaboard to the mountain summits, and fr
vine-clad banks of the Ohio to the cane fields on the alluvial plains of Lo

It was one of the first railroad enterprises undertaken in the United Sta
as it is one of the most extensive. The length of the main stem, from Bal
to Wheeling, is 379 miles; that of the Washington branch, 31 miles. U
branches increase its total length to 520 miles. Of sidings and second
track there are built nearly 300 miles more. The original cost of the
work is thirty-one millions of dollars.

Its heaviest permanent grade on the eastern declivity of the Alleghanies is
116 feet per mile for 17 miles; its greatest altitude, 2,620 feet. It h
repair stations, 33 repair shops, 98 water stations, 30 telegraph stations
lines of wires, 14 tunnels, 12,694 feet of tunnelling, 186 bridges on the m
stem, 15,088 feet of bridging, about 4,000 cars and nearly 238 engines,
gives occupation to 5,000 officers and employés. Its annual income, in g
times, has been five millions of dollars.

The road-bed is probably superior to any line of considerable length
America. It is rock-ballasted, and laid with heavy rail strongly secured. Th
first rail used weighed fifty-five pounds per lineal yard, for which rail of seve
five and eighty-five pounds was substituted, and recently it has been incr
to one hundred pounds.

Astonishing activity has characterized the repair of portions of the line d
aged by raids during the war, and remarkable exemption from accident is no
ticed, as, during the entire existence of the road, it has suffered but one
accident, and that was due to an unavoidable circumstance when the
was new.

Several years ago it was estimated by an officer of the road that an a
10,000 men could be transported over it in thirty hours. The prediction
more than verified in the following, received from W. P. Smith, the wel
known and efficient master of transportation of the road:

"The heaviest movement that we have made, or that has been made by any railwa
the country, was of the 23,000 men in Hooker's two corps, in September last, from W
ington to Chattanooga. This great body of men, with all their artillery, equipage, w
and effects, including the cavalry horses, occupied about 1,000 cars, and were carrie
Washington to Benwood, on the Ohio river, (400 miles,) in about forty hours."

The scenery of West Virginia along the line of this road has been the as
ishment and admiration of travellers from all quarters of the globe.

From Harper's Ferry, where the road has broken a rough passage thr
the frowning mountains of the Blue Ridge, to the crossing of the Potoma
before Cumberland, a distance of ninety-eight miles, the road passes thr
the eastern section of western Virginia, a mingled scene of rough ravines, ra
rapids, widening plains, and mountain barriers, which push forth encroachi
upon the river, compelling a detour not made by the stream without a m
yet unavailing murmur.

After a run through Maryland of little more than twenty miles, a corner
Hampshire county, in West Virginia, is struck at New Creek and Piedm
the terminus of the first division of the road and site of extensive machine sh
From this point a rise of about nineteen hundred feet is accomplished in sev
teen miles, the steepest railroad grade in the country. Passing the glade l
of the summit, which are in Maryland, the traveller is again introduced in
West Virginia just as he commences the western descent of the Alleghani
and views a beautiful panorama of mountain peaks piled upon receding m
tains. Soon the most sublime of railroad scenery is in view; the passage
the Cheat river, the winding along the almost perpendicular sides of the

with the chocolate-colored stream far down at its base, and a similar range
he opposite side, presenting to a distant observer a scene aptly represented
a walk furrowed around the spire of a towering steeple. Cheat river is
by a viaduct based upon abutments and a pier of solid freestone. A
arther westward, Kyer's run, 76 feet deep, is crossed by an embankment
onry; then Buckeye Hollow is bridged by works 108 feet in depth;
ut not least, the famous Tray Run is crossed, at the height of 150
y a viaduct 600 feet long, a huge net-work of iron upon a massive base
nry. At the west end of the viaduct, from a broad ledge overhanging
ipice, an impressive view of the great chasm of the Cheat river is ob-
, with the stream itself three hundred feet below, winding northward and
ng among the mountains.

oon another barrier is reached. Projecting spurs have been circumvented,
avines overleaped, aspiring knobs bisected, and the height thus persever-
overcome; but here confronts the road a peak yet 220 feet higher still,
y a mile in breadth, of solid earth and rock. The work of tunnelling
ssed three years; a year and a half more was consumed in arching it
k and stone, and it was finished—the Kingwood tunnel, 4,100 feet in
n, costing one million dollars—a monument of engineering skill and a tri-
h of patient labor.

rafton, nineteen miles further on, is the point of intersection for the Par-
kersburg branch, which is 104 miles long, while Wheeling is 100 miles distant
by the main stem. Near Fairmont, just below the junction of the Tygart's
Valley and West Fork rivers, forming the Monongahela, is an iron bridge 650
feet in length, which has been destroyed during the rebellion and since rebuilt.
The mountain scenery of West Virginia can better be appreciated by actual
vision than described by the pen of the traveller.

The Hempfield railway is completed and running from Wheeling, east, to
Washington, Pennsylvania, thirty-five miles. It is to be continued to West
Newton, fifty-six miles from Wheeling, on the Pittsburg and Connellsville
road, and thence to Greensburg, on the Pennsylvania Central road, seventy-six
miles. In the route to Philadelphia, this will save the distance from Greens-
burg and twenty miles additional—in fact, nearly half the present distance be-
tween Wheeling and Greensburg. It will also shorten the route from Ohio,
especially eastern Ohio, to Philadelphia.

These are the only railways at present in operation. Others are in contem-
plation, and will undoubtedly be built at an early day after the return of peace.
One has been organized and partially constructed.

The Covington and Ohio railroad, designed to connect Richmond with the
O river, was completed in 1860 from Covington to the White Sulphur
. The work upon the road was continued, and a large sum of money
d in grading, tunnelling, and piers for bridges. The tunnels between
ings and the Gauley were approaching completion, and from Charleston
Ohio the road was in an early state of forwardness. It was designed to
t at Catlettsburg, on the Kentucky line, with the road thence to Lex-
which was graded and intended to be promptly finished as a section of
ugh line to the west and southwest. A road through the Kanawha
, without reference to through business, was recognized as a necessity in
elopment of the interests of this inexhaustible depository of natural
. and credited as a paying investment. In a normal condition of affairs
would, at the present time, have been completed and in receipt of a
rade. It must eventually be built; when, it would scarcely be safe,
predict.

and, under present circumstances, more important line, may first be
intended to intersect the State centrally and longitudinally, to
o river and Kanawha valley with the Baltimore and Ohio rail-

road, and eventually with the Pennsylvania Central, west of Harrisburg Charleston, Buckhannon, Phillippa, Independence, Kingwood, and Bran ville, or by some parallel line connecting Preston county with Charleston. is intended to strike the Pittsburg and Connellsburg road at the n Casselman's river; thence, by Somerset or Bedford, to Huntingdon Pennsylvania Central. It would develop a region rich in all the mine the State, passing over coal and iron mines almost every step of the rou fusing life into all the veins of industry, and rendering plethoric with this youthful and vigorous Commonwealth.

POLITICAL ORGANIZATION.

On the 13th of May, 1861, twenty-four days after the adoption of sec by the convention at Richmond, delegates from twenty-five counties Wheeling and passed resolutions in condemnation of the traitors and the c of Richmond, and providing for a convention of all the counties adhering t Union.

On the 11th of June, representatives from forty counties assembled at W ing, on invitation to all loyal men of Virginia, and declared independe the action of the State convention, announced an interregnum in the c government, and took measures for the establishment of a provisional g ment.

On July 2d the legislature, duly elected, convened at Wheeling, and United States senators, passed a stay law, and voted $200,000 for carrying the war, and the same amount for the operations of the State govern October 24th the action of the legislature was approved by the people in a v almost unanimous.

A convention met at Wheeling, November 26, 1861, and framed a constitution, and on the 3d of May, 1862, that constitution was approved a adopted by the qualified voters of the proposed State. On the 13th day May, the legislature of Virginia gave its consent to the formation of a ne State within the jurisdiction of Virginia.

On the 31st December, 1862, the President approved the act of Cong for the admission of the State of West Virginia into the Union, to compri the counties of Hancock, Brooke, Ohio, Marshall, Wetzel, Marion, Monongal Preston, Taylor, Tyler, Pleasants, Ritchie, Doddridge, Harrison, Wood, Jac son, Wirt, Roane, Calhoun, Gilmer, Barbour, Tucker, Lewis, Braxton, Ups Randolph, Mason, Putnam, Kanawha, Clay, Nicholas, Cabell, Wayne, Boo Logan, Wyoming, Mercer, McDowell, Webster, Pocahontas, Fayette, Ra Greenbrier, Monroe, Pendleton, Hardy, Hampshire, and Morgan, to which been subsequently added Berkeley and Jefferson, making fifty counties, in ing a total area of about 24,000 square miles.

This act took effect in sixty days after the proclamation of the Presid stating the fact of its ratification by the people, and the adoption of the lowing in place of the clause in the Virginia constitution respecting slavery

"The children of slaves born within the limits of this State after the fourth day of Ju eighteen hundred and sixty-three, shall be free; and that all slaves within the said St shall, at the time aforesaid, be under the age of ten years, shall be free when they at the age of twenty-one years; and all slaves over ten and under twenty-one ye be free when they arrive at the age of twenty-five years; and no slave shall be perm come into the State for permanent residence therein."

CONCLUSION.

In conclusion, the writer would observe, in justice to himself, that he endeavored to make as full and impartial an exhibit of the resources of W Virginia as circumstances would permit in an article designed to be only perficial and preliminary. In the absence of official documents, records

l or scientific societies, local addresses, and newspaper articles of a
ıı or descriptive character, the territory has been almost a *terra incog-*
ıe explored in person, and its peculiarities gleaned from the mouths
wit :sses. Some portions of the State were thus visited, and very
e ved; portions had been traversed years before; still much of the
ı left to be appropriately characterized, if possible, by careful analysis
us weighing of the statements of those whose opportunities for ob-
nave been ample.

ıne acknowledgments of the author are respectfully tendered to all those
have so promptly co-operated in this work, especially to his excellency
nor Boreman; to Hons. W. T. Willey and P. G. Van Winkle; to Hon.
v. Whaley, of the third congressional district, whose zeal for the welfare
district and State has been unabated; to Hon. John M. Phelps, presi-
ıf the State Senate, and Senators Burley, of Marshall, Carskadon, of
ire, Stevenson, of Wood, and Young, of Pocahontas; to members of
ouse of Delegates, McGrew, of Preston, McWhorter, of Roane, Ruffner,
kanawha, and Crawford, of Hancock; to Messrs. W. P. Smith and J. B.
of the Baltimore and Ohio railroad, H. Hagans, of Preston, J. H. Diss
of Doddridge, C. S. Richardson, of Kanawha, District Attorney Smith,
ı wha, A. W. Campbell, of the Wheeling Intelligencer, J. E. Wharton,
ıı r ersburg Gazette, E. M. Fitzgerald, of the Point Pleasant Register,
rs.

..E CULTURE AND MANAGEMENT OF TOBACCO.

BY L. J. BRADFORD, AUGUSTA, KENTUCKY.

THE cess of a growing crop of tobacco depends much upon early planting. The ıuon of such situations for plant beds as will insure a proper exposure ı sun is all important. The eastern or southern slopes of hills, near their afford the best locations, the beds so situated being free from sobbing, and rarmth of the sun greater than upon a flat surface.

ıegard should also be had to the character of the soil. It should be suffi- close to render it retentive of moisture, and yet contain sand enough to ıve ıı quickness. Made earths and puffy soils are unfit for tobacco, being too liable to heave.

ocea ı · be sown from the 1st of January to the 10th of April in a hot-bed, ı ıay on a patch of ground prepared by burning on it a quantity of

ı prepared in the early part of the season require more burning than a later period. There is little danger of burning too hard, however, at , as the plants genetally succeed best on beds most thoroughly burned. ı beds are burned and cooled off, they are dug up with a common g hoe deep enough to afford the plant a loose soil in which to extend In the preparation of the beds care should be taken to leave the sur- as much on top as possible, as it will promote a quicker and better ı ı young plants. After the beds are well pulverized by hoeing and seeds mixed with dry ashes are to be sowed as evenly as possible e, at the rate of a common table spoonful to every eighty square lightly raked over or trod evenly with the feet, well covered

with leafless brush, and protected from the intrusion of stock. As soon as plants attain the size of the silver dollar of former days the brush may be moved, though, if the weather is dry, it will be an advantage to have it r longer, and when removed it should be taken off in the evening. T designed for the crop should be fertile, and if not naturally so, should be manured, as tobacco is a plant that delights in rich soil. Any common will answer the purpose. If possible the land should be deeply and thorou ploughed in the fall or winter. There is twofold advantage in this: firs destroys many insects that would be injurious or destructive to the young pl and secondly, it renders the ground more friable and more easily cultivated.

As the season approaches for transplanting, which is here from May to the land should be ploughed again, and kept clean. It is then to be with a plough three and a half feet each way, and a small hill made in ei the check, as may be preferred, for the reception of the plant. The size of hill may be according to the fancy of the planter, as it is not a matter of sequence. When the plants are large enough they may be drawn from t beds and placed in the hills whenever there is moisture enough to prevent dying. The best time is soon after a shower, unless the land is very wet which case it should be left to dry or settle some. After transplanting, ther attention is required till the weeds and grass make their appearance; t should be at once subdued with the plough and hoe. If the earth becomes dry and hard about the plant it should be lightly scraped with a hoe, which will greatly facilitate growth. As soon as the plants are of size to permit it without injury, the ground should be deeply and thoroughly ploughed, care being taken not to disturb the roots, and the plant hilled up by following with a hoe. In land that has been kept clean this may be the last ploughing, the hoe being all that is needed to keep down the few weeds that may appear. When the plants are large enough to top, the leaves nearest the ground are to be broken off and the bud taken out, leaving on the stalk the number of leaves designed for the crop. This number is much a matter of fancy, yet it has more to do in forming the character of the future tobacco than most planters seem aware of. Experience has fully proved that ten or twelve leaves are sufficient for a plant, and this is almost the universal number among our best planters. If the crop has grown well, twelve leaves may be allowed at first; the next topping it may be ten, and the number thus lessened as the season advances, or as the appearance of the crop may indicate. This saves much labor, insures more uniformity in maturing, and adds to the value of the crop, making it more uniform in quality.

At this stage the attention of the planter is almost constantly required in protecting the crop from the worms and insects that prey upon it, and in breaking off the suckers which soon appear at every leaf along the stalk. This will give ample employment to all idlers about the premises.

As the plant approaches maturity it begins to thicken, and assumes a dull sleek, and motley appearance, which the most unpracticed eye will readily observe. Should the weather be dry and favorable, the first ripe plants may remain standing till a sufficient quantity matures to make a regular cutting; but if the weather is unpropitious it is best to cut as fast as matured, as it is liable to injury if allowed to remain too long.

The harvest time of the crop is an important period, as any neglect then on the part of the planter will result in depreciation of its future value. In cutting the plant a sharp knife is to be used, and the stalk to be split about half its length, taking care not to break the leaves or otherwise injure them. The plant is then to be set with the butt of the stalk up, exposed to the sun. When it is wilted enough to handle without breaking, it should be taken up and laid in heaps of from seven to nine in a place, and then hung as soon as possible to prevent its being scorched by the sun. The latter part of the day is best for cutting; there is less danger of the plant getting sunburnt.

ıe sticks on which the plants are hung are small pieces of timber about feet long, and of sufficient strength to support them. These, when filled, be ·:en to the barn on a cart or wagon, or may be placed on a scaffold in ı. If the weather is fair it is best to sun the crop, as it aids the curing us to the strength and elasticity of the leaf after it is cured. Care should ·t to place the sticks too near each other if the weather is damp and ınere is danger of injury. After remaining on the scaffold a few days s › color of a leaf in autumn; it must then be taken to the barn or n e and placed away, keeping the sticks far enough apart to secure a ıculation of air through them. If the weather is wet, it is best to take s to the house at once and let the following process take place there ınan risk it in the field, as rain is always injurious to tobacco after it is . especially so after it becomes yellow.

curing process is of the utmost importance to the future value of the and too much care cannot be given to it. If the weather is dry, and the not too much crowded in the house, the action of the atmosphere ne assisted by furnaces instead of fires. Smoke from fire is very inju- :o fine manufacturing and cutting tobacco; all lovers of the weed greatly its natural flavor. Many accidents happen yearly from the use of fire. ence in the sale of one good, ripe, furnace-cured crop will pay for all ıay for furnaces and fixtures for twenty years. The heating is more and less fuel is used. Where furnaces are not to be had, a small fire :t the object. If the weather is warm and damp the atmosphere will materially in curing the plant, and unless firing is resorted to it is cer- o be more or less injured. It is always safer after a house is filled with tobacco to rely mostly on the action of fires for curing.. These should be slow at first, and continued so until the moisture engendered by the ed out, and then increased till the leaf is nearly cured. Then the fires ne allowed to go out, and the tobacco to come in case, or get soft again. ity will be much improved by permitting it to come in case once or ıefore it is thoroughly cured in leaf and stalk. Dry sound wood is best ıne fires.

If the planter desires to make a piebald or fancy article, care should be taken o permit the leaf to get very soft during the curing process. To make a fancy article, the tobacco must be thoroughly yellowed first, and then be entirely by fire. This particular description, however, is not more desi- or valuable to consumers, as the essential properties of the plant are fre- y destroyed by the action of the fire. As a general thing, it is better to the weed by the natural process of the action of the atmosphere, and where has room enough to house the crop without crowding too close, the ne attained without much fire, saving wood and avoiding much danger. ıng now reached the point when it is supposed the crop is secured and we proceed to give some directions in regard to its future management r ation for market, as many, after all their care and labor, lose their o a great extent by want of knowledge in this respect, or by inexcusable ss.

he tobacco is thoroughly cured it is ready for the process of stripping, the l es from the stalk. The plant first passes through the hands ex rienced laborer on the farm, who takes off the bad or injured nem neatly in bundles of eight or ten. The plants thus culled o ot s, who strip off the remaining leaves and tie them in bands of wrapping tightly with the tip of the leaf, used as a tie, so as to form and a half inch in length. These bundles should be as uniform e and color, as it adds to the beauty of the sample by which it

When the day's work is done, let the bundles, neatly pressed through hands, be put in a winrow—that is, laid straight in a bulk or pile long c to hold the work of one or two days, and only the width of one bundle half, reversing each course so as to have the heads of the bundles out. it may remain till stripping season is over.

Cold, winds, and frosty weather injure the texture and rich flavor of t The first good drying weather after the stripping get the smoothest and est sticks upon which the tobacco was hung, and hang it up again to When the weather becomes moist enough to bring it in case, take it down carefully bulk away as before directed, only taking more pains to strai the bundles and make the bulk much wider; this is done by lapping the dles over each other like shingling a roof, the bulker having his knee upon bulk, carefully laying down the tobacco as it is straightened and handed to When the bulk is finished, weigh it down heavily with logs or some weight.

Care must be taken that the tobacco does not imbibe too much moisture get too high in case before it is bulked, as it will injure. Whenever it is enough to handle without breaking it may be put in bulk; and should the s break a little under the pressure of the bulker's knee no material damage be done, provided the leaves do not crumble. A little attention will soon te the most ignorant the proper order for safe-keeping. The tobacco will be in bulk, and will wait the planter's convenience to prize it in hogsheads.

In prizing, the different qualities should not be mixed, and, if proper care has been taken to keep them separated, no trouble will be had in assorting them. In packing, every bundle should be kept straight, and every leaf to its bundle. From a well-packed hogshead any bundle may be drawn without injury or disturbance to others. The usual way of packing is to commence across the middle of the hogshead, placing the heads of the first course about eight or ten inches from the outer edge, and running the course evenly across; the bundles of the next course are placed in the same direction, the heads against the side of the hogshead, and follow the circumference till the heads of the two courses come in contact. After that course is completed, the other side is finished by placing the heads against the cask as before, so as to have three courses across the cask, the bundles all laid in the same direction. The next layer is reversed, the packer carefully laying each bundle as it is handed to him. When filled, it is subjected to the press or screw and pressed down.

Our hogsheads are from forty-four to forty-eight inches across the head, fifty-eight inches deep. From 1,800 to 2,000 pounds can easily be prized them. If the tobacco is large, rich, and oily, the harder it is pressed the l ter, and the better price it commands. These remarks are especially applic to those heavy kinds of tobacco grown where the soil and climate are pecu liarly adapted to its production; such as is known in Virginia as heavy s ping leaf, and in the west as Clarksville tobacco. In climates and soils not well adapted to it, the same variety will assume a different character, texture of the leaf being changed, being more light and bulky, and destitu of oil and substance. Tobacco of this description should be managed as above directed, but prized lightly in the casks, so as to admit of a free and open leaf, such being mostly required for cigar leaf.

The writer has been a close observer of tobacco sales for many years, has seen a difference of two to five dollars per hundred weight in crops gr on adjoining farms, cultivated in the same manner and sold on the same day. The buyer must take the tobacco as it comes from the planter's hands; can only use a certain part of it per day. That in safe condition he can for future use, and is always willing to pay for it the full market rates; out of condition he must keep till he can use it, and, if he considers his inte buys at what it will be worth to him when he shall be ready to work it

by throwing on the planter the injury and loss in the tobacco from the of purchase to that of manufacturing. This loss is considerable. The has to bear it; it is right that he should. He has no cause to com- of the manufacturer. If he feels like doing so, let him come here in Sep- or October, and walk into one of our large factories and take a look at ead then being pulled up, bearing his own name on its head, and sold n the spring. He would feel sympathy for the manufacturer, rather him for the low price he gave, and would congratulate himself that that tobacco had parted company.

Planters can remedy this liability to loss. It is useless for them to talk bad season for striking, bad winds, cold winds, too much or too little , and so forth. This will not help the matter, or exonerate them from a y owe themselves. These bad seasons are not universal. They do every planter. There are men who always manage their crops prop- lefiance of too much season, or too little season, or no season at all. are men of reputation as planters, and men who will sustain their repu- . Examine their crops year after year, and they will invariably be found ondition, and will always command the highest price.

HEMP CULTURE.

BY L. J. BRADFORD, AUGUSTA, KENTUCKY.

The culture of hemp is an interest of great and growing importance in the its production heretofore being mainly confined to Kentucky and Mis- ; but there can be no reasonable doubt in the minds of those who have en the subject any attention, that in the production of hemp, Iowa, Minne- nd Wisconsin have vast advantages over the above-named States.

Many writers have advanced the idea that hemp, like cotton, could not be wn by free white labor, and that its production would, for some time at be confined to the slave States. Nothing can be further from the truth; te the very best adapted to hemp growing is found far north of the of the negro, and where he would absolutely suffer from its effects. short, quick forcing seasons of growth are best adapted to the plant. th of this great staple in a climate such as the region referred to actually s, makes the day not far distant when these will be as noted hemp- g States as Kentucky and Missouri ever were. It is to be regretted our census returns hemp and flax have been confounded; it may, how- be ly assumed that its growth and preparation are so far below the umption of the country as to assure the agriculturist of a continued and paying prices for many years to come; and the experience ky and Missouri has fully proved that the production even of an in- has been and is yet remunerative. The reader must bear in mind t American hemp is almost exclusively what is technically called "—that is, spread upon the surface of the earth and there rotted ocess of the elements. France grows more hemp than flax for facture and the finer grades of cordage and twines, the fibre y superior to American, from the fact that her climate is of a lower hat portion of this country that grows hemp, and the addi-

tional fact that she has abundant supplies of pure soft water for steeping in rotting process; and the same is true of the Russian production.

The soil of Kentucky is as well adapted to the growth of this plant as in Europe or America, but there her adaptation ends; her general t ture is too high, and she is entirely destitute of water of the proper q the steeping process; hence all attempts to furnish our navy from u have been failures, notwithstanding that department has offered gr ments to her growers to water-rot.

Iowa has, with a climate much colder than Kentucky, and pure soft in her small lakes and streams, a soil certainly equal in fertility to any on globe; why may not, then, her enterprising people reach forth their har lay hold of this prize, so well adapted to her soil, climate, and situation the process of dew-rotting, the fibre, especially in warm climates, is mate deteriorated, and in some cases so far injured as to produce a very low g of lint, unfit for anything but the coarsest and lowest kinds of bagging. is especially the case when exposed to the dew process in open, wet winter Kentucky, thus proving that the true hemp latitude is north of this State.

Cold, snowy winters, on the contrary, universally produce an imp quality of lint, always brighter and stronger.

CULTURE OF SEED.

The first step in hemp culture is the production of good, sound, seed. Land intended for seed must be in good tilth and well prepared by e corn planting; it should be laid off in straight rows, four feet apart each wa and planted in hills seven or eight seeds to the hill; the same rules observe for cultivating corn will apply in the after culture of hemp seed; when plants reach the height of six or eight inches, they should be thinned to fr three to four plants.

Hemp plants are divided into male and female, the former producing t pollen or impregnating powder, the latter bearing the seed. A very little o servation will enable the grower to distinguish between them. As soon as t distinction can be made, the male should be drawn up by the root, except he and there a solitary one left that the female plant may be properly impre nated; the female is to be retained until its seeds are perfected, when it is be harvested by cutting at the ground and removal to cover; when cure detach the seed with a stout stick of convenient length, winnow and put up barrels or sacks, perfectly dry, and out of the way of rats and mice.

PREPARATION OF LAND.

The soil for hemp must be a strong, calcareous, deep, warm, loamy, perfectly dry one, deeply and thoroughly prepared by ploughing and cr ploughing, until a fine state of tilth is produced, more or less, according to previous condition.

PUTTING IN THE CROP.

The ground having been faithfully prepared, the grower must hasten t operation of seeding with the utmost despatch, as, generally, the earlier t seeding the heavier the lint of the plant. Mark off the land with a s plough, and very shallow furrow, or it may be marked off by a drag made a small log of wood—anything to make a line to guide the sower accuratel then proceed by hand to broadcast your seed evenly at the rate of fifty pour of seed per acre as the minimum, or even up to seventy pounds as the mum quantity, varying with the strength of the land, the object being to p duce as thick a growth of plants as the land will sustain. If set too thin

grow too large, producing a coarse and inferior lint; on the
too thick, the growth proves so short as to materially affect
crop.
of the hemp-growing section of Kentucky the seeding is
1st to the 15th of April, and the land generally ploughed

ne seeding should be done as soon as the ground proves to be in
ng order. Although the seed itself seems very tender, its vitality
its germination after sowing often seriously disturbed by
circumstances, yet when once above ground, and fairly set, no
sts that destroy other vegetation seem to affect it; hence but little
a be apprehended from late frosts, that prove so destructive to corn.
ed being sown, proceed to cover them up with a light harrow by run-
ways to secure uniform results; the more shallow the seed is covered
the more certain the vegetation. If the season and soil be dry,
deeper covering may be necessary. Under favorable circumstances,
es its appearance in a few days, and with proper sun and moisture
covers the ground. From seed time until harvest, the laborer has
atch its almost magic growth from day to day.
aving once covered the ground, the crop is generally considered safe
rower; yet he is sometimes doomed to disappointment. Hail-storms
destructive to the tender watery growth of the young hemp plant;
damage the yield, but never entirely destroy the crop.

RIPENING AND HARVESTING.

urity of the crop is indicated by a change of color in the leaf, it
ading from a deep green to a paler hue; also a shedding of the
ginning at the bottom, and gradually extending up the stalk.
ale plants ripen fully ten days earlier than the female, and in some
, where labor is worth next to nothing, the male is first harvested by
n up by the roots, and the female is left standing. In our country
ode of harvesting is impracticable; hence the American grower must
e time as near as may be between the earlier and later ripening, and
the best results possible under the circumstances.
e plant is covered with very minute pods bearing pollen, which, at
st and fill the whole atmosphere: and the pollen may be seen
im nse clouds, and floating away from the field. This, in addition
li on previously named, shows the crop is ready for the knife. This
it of a peculiar shape, perfected by long experience, and need not
ribed, as it can be purchased in the hemp region of Kentucky at
smithy.
t manner of harvesting was pulling, as with flax, but this mode
been abandoned in favor of the hemp hook, as the knife is called.
Cormick, esq., of St. Louis, Missouri, and Versailles, Kentucky, has
cutting machinery as an attachment to the McCormick reaper.
used the attachment, and considers it a perfect success. It will
nook in all level lands, and must prove well adapted to Iowa.
some of the best hemp lands lie so rolling and rough as to
ne its use. If the crop is to be cut with the hook, the operator
at once through a width corresponding to the length of the
to the ground as possible, spreading his hemp in his rear
swath, where it remains exposed to the sun's rays until it is
and the leaves sufficiently dried to detach easily. This last
omitted by careless growers, and, some contend, without

The hemp can be shocked or stooked (as the Yankee would say) with compactness without the leaves than with them, and any operation influence upon the future security of the staple from dampness or at sp influence is certainly important; the perfect detachment of all the leaves then in nowise be omitted. No time should be lost, after the stalk is getting the crop up and into neat shocks; every additional day's exp sun, wind, rain, or dew is deteriorating its quality and subtracting from quantity. The brighter the stock can be secured the better.

The same rules will apply to hemp that obtain in securing good hay. operator, in taking up the hemp, uses a rude stick cut from the branches of nearest tree, about the length and weight of a heavy hickory walking having at the end of the stick a small branch making a hook. With primitive but very effective tool he can rapidly draw the stalks into of the proper size for sheaves. In operating he throws his rude hook for to its full length, and suddenly draws it towards him, each motion maki a bunch. This he raises quickly from the ground, and with his hook, by a well-directed strokes, divests the plant of its leaves. He then binds his with its own stalks, and passes on to repeat the operation. Other laborers follow, and place the hemp into neat, close shocks of convenient size, securing the by a neat band made of the hemp stalks themselves, after the manner of shocking corn. Here it is suffered to remain until the whole crop is thus secured as soon as possible, selecting clear, dry weather for the operation. The whole crop is to be secured by ricking or stacking. The same rules to be observed in stacking as with grain, the object being to keep the crop secure and dry until the proper time for rotting arrives. In the latitude of Kent about the middle of October is the proper time. The crop must be retai in the rick or stack until the summer heats and rain have passed, and frost appe instead of dew. The whole crop is then removed from the rick, and hauled back to the same ground on which it grew, there to be spread in thin swaths for rotting, where it remains without turning until properly rotted. This is indicated by the fibre freely parting from the stalk, and the dissolution by the action of the elements of the peculiar substance that causes it to adhere thereto.

This stage is only to be learned to perfection by practical experience; yet the novice must have some information to enable him to begin, and it is easily acquired by a little observation.

When the operator finds his hemp sufficiently rotted, the wooden hook again brought into requisition for once more drawing the swaths into conve nient bunches. The hemp will have lost much of its weight, and can be bunched and shocked with less labor than at first; besides, at this last shock ing, the binding is to be omitted entirely, the hemp is to be carefully and neatly handled, all tangling to be avoided, and placed again in shocks, and firmly bound at the top.

Then comes the last and crowning operation—breaking and dressing fibre or lint for the market. The peculiar break to be used, like the knife hook for cutting, needs no description, being manufactured in the old l regions, at a cost of about five dollars each, and from long experience l found perfectly adapted to the uses required. The beginner would save t money by ordering a sample break, from which any carpenter can manu as desired.

The crop is broken in this climate directly from the shock in the open a by the removal of the break from shock to shock as fast as broken. In Iow owing to the severity of the climate, it would probably be necessary to r the rotted hemp to the barn, where the labor of breaking could be certainly performed. The coldest and clearest weather is the best for operation; in fact, excess of dampness in the atmosphere suspends this l altogether. The breaking process is laborious, yet more depends on the than on the strength of the laborer.

I e endeavored to describe the whole process as practiced by the best n Kentucky. The same mode will certainly apply to Iowa up to the process. With her advantages, steeping in soft water is entirely prac- by which she will produce an article of water-rotted hemp perhaps in t inferior to the highest-priced Russian, which is fully double the value an dew-rotted, the only sort produced in this State.

ri apprehends that the season is too short in Iowa for the successful m seed—a want easily supplied by the purchase of seeds grown in s ern latitudes; but no shadow of doubt exists in his mind that she at me very first effort, produce better hemp than any territory south of], he thinks, will demonstrate that Iowa, Minnesota, and Wisconsin me true hemp region of the American continent.

ROOT CROPS.

BY T. H. LEVERETT, KEENE, NEW HAMPSHIRE.

The cultivation of the root crop, generally, throughout the United States, and particularly in New England, is of vastly more importance to farmers than they are aware of. In the raising of stock in Great Britain the root crop comes in for a large share of attention as a cheap and profitable article of food. There is no lack of expenditure, both in manure and labor, in order to secure the largest possible yield of this crop. In Canada West, land adjoining our own, the good and thriving farmers grow large crops of roots for their sheep and cattle, and make them profitable. It is universally admitted that the growing of grain in the New England States cannot be made remunerative to the farmers generally; that particular branch of agriculture is more profitably attended to by the farmers at the west. The western States must grow the grain for the east, therefore New England farmers should turn their attention more to the cultivation of roots, which they can make profitable, for they can buy grain cheaper than they can raise it. There is no farmer in New England that makes any pretension to raising cattle, sheep, and horses, but should have from one to five acres of roots of various kinds, and the farmers in the middle and western States would find it greatly to their advantage to make a special business of raising roots to feed their sheep and cattle during the winter months; and, with such land as they have, it is wonderful what amount can be grown upon an acre.

MANGOLDS.

I will give my experience in growing mangolds the last few years, and the of them, with the results I have observed.

ngold is a great lover of rich land, and the more manure the larger I have usually sowed the seed early in May, using about four pounds to the acre, and have used land that had been planted with corn and s the year previous, and had been well manured; then I plough in about horse-cart loads of manure to the acre, plough eight inches deep, then thoroughly, and level the piece as well as I can with horse-power. The I ever planted was ploughed and harrowed, then cross-ploughed and the second time, making the soil fine and mellow, and mixing the thoroughly with it.

I will here remark, that I have invariably found the largest crop when ploughed and harrowed my old ground twice before planting; it will pay extra expense. How can the small roots of the plants find nourishment lumps of manure and earth? they run off a long distance for support, and go round any lump of manure or hard substance which they cannot pen and, unless it is worked over so as to be free from lumps, the farmer mi well leave it in his barn-yard as to think of getting any good from it in s state. The great secret in growing large crops of roots, or any crop on ploughed land, is in getting the soil fine—as the old saying is, as "fine a onion bed." That remark applies to the growing of all kinds of grain and as well as to onions.

In 1863 I spread upon an acre of land (before ploughing) that had b grass for several years, about eight cords of strong manure from my bar and ploughed eight or nine inches deep with my Michigan or double plough, leaving the sod well covered with the soil, then rolled and harrowed it well, and it as level and smooth as possible. I then furrowed it out at a d would let my horse go in one furrow, and the wheels of the cart in the two; spread fine manure directly from the cart in the furrows; had a man low with a rake and bring back the soil which the plough turned out furrowing out for the manure; if any lumps of earth or turf were in the row they would be removed at that time. Then, as soon as possible, after cove the manure, the man would sow the seed upon this ridge. Much time was s upon this acre in preparing the land, manuring, &c., thinking I should get a large crop, but the season proved bad for all kinds of roots. There was much rain. The soil is a sandy loam, and was in good order, usually rich land. I did not have more than a quarter of a crop, and attributed failure to the mode of culture more than to the season. I think green swarc not suitable for growing mangolds; they grow chiefly out of the ground, need richer soil nearer the surface. This was the second time I had failed planting them in this way, and I shall not try it again. One reason why attempted this mode of culture was to keep the land as free from weeds as sible. Old ground filled with manure is more inclined to grow weeds than ground.

In 1862 I planted an acre of land upon which I had grown a hoed crop well manured, ploughed in about twenty four horse-cart loads of manure fr barn-cellar, then cross-ploughed it, harrowed it well, and sowed to mang and sugar beets. The sugar beets did not come up well, and I ploughed part up, about one-quarter of an acre, and sowed to turnips of the purple variety, (it was rather late for beets,) sowed the seed in drills, and kept t well weeded and thinned out. The result was a very large crop of both golds and turnips. I never saw such a growth on an acre. I had about ou bushels, costing me about seventy-five dollars, (charging one half of the manu to the crop, and nothing for the use of the land, which was worth twelve do lars,) making the cost of the crop about eleven cents per bushel. There w probably more than twenty tons on the acre. Mangolds are heavier th carrots per bushel, and English turnips not so heavy—and who would rather have that crop of 800 bushels, than an acre of corn of 40 bushels, w is more than an average throughout New England? The weight of mango the fall is about 60 pounds. I have weighed them in April and found they shrunk only 8 pounds, while my carrots had shrunk from 51 pounds to 40; on mangolds is 13⅓ per cent; loss on carrots is 21½ per cent.

TIME OF HARVESTING.

This should be done before the cold and frosty nights arrive, as the fr of the tops injures their value for feeding purposes; besides, the men can remain in the field in pulling and topping the roots. The tops at that t

s to feed to milk cows when the pastures are failing, and the cows
o be kept with a full flow of milk and not allowed on the mowing fields,
saving all of the manure and getting more milk.

been my practice for ten years past. I have some years kept four
four weeks entirely upon the tops of the carrot, mangold, and turnip,
s being in the barn and barn-yard all of the time. Some years I have
them on to about two or three acres of land, and spread the tops of the
. the field for them to pick up; but in so doing I lost most of the
, all of the liquid portion, and the solid was of little use to the land, as
ving farmers will testify. The turnip top should be fed sparingly to
ng milk, as it imparts the turnip flavor to the milk and cream more
than other root tops, and more than the turnip itself.

THE FEEDING OF MANGOLDS.

T should never be commenced till January, or, as they practice in the old
, till Christmas, as "they are not ripe and not safe to feed," frequently
ck to "scour" if fed too early. In feeding them to cows and young
. have found that it has been very much to my advantage over grain,
all things into account. I have grown better looking heifers and
without any grain, and cheaper than upon grain and hay. All young
s should have something more than hay while growing; they will keep
health, have better appetites, will eat up coarse fodder cleaner. Their
always sleek and glossy; they are in good spirits, always feeling well.
ws that are with calf, and are "coming in" in the spring, are in better con-
and my cows never have any trouble at that time; make better bags,
less likely to make a miscarriage. I have known many cows that have
trouble, and frequently died when they were in high condition, having been
with grain during the winter with no exercise; they were not in a good healthy
on. Cows that are in milk during the winter, eating one peck of roots
, will eat no less hay, but will look better, although it is but a small
ity to feed. When I have a large supply of roots I practice giving from
bushel to a bushel each day, directly after milking, and never found the
imparting any unpleasant taste to the milk or cream. Then I have
they would not eat so much hay, but would grow fat, and it has been
ked to me, that "you give considerable grain to your cows: what kind
feed, &c.?" I can say the same in feeding roots to sheep; they would
at so much hay. I have had a very good trial of that the past winter.
having so many roots this last year, I have been obliged to be more
al with them, and have fed them to the ewes and cows that are to come
pring. I find my other sheep are not doing as well as they did the two
s winters. I have lost more than ever before, have had more ailing, and
o not look as well. I have a regular hospital for feeble sheep, where I
e them better feed and more attention. During the winter of 1862–'63
t to my sheep and cows seven bushels a day, and am satisfied that had
for my roots I should have been obliged to have bought several tons
o have kept my stock out, and they would not have been in so good
nor looking as well as they did.

ng care of the mangolds during the season, it is of great importance to
free from weeds, and the ground often cultivated and ploughed be-
rows. When they have grown to a tolerable size, say in August and
care should be used in not injuring or breaking them down, though
it suggested that the leaves might be broken off and fed to cows,
sure that such practice would injure the crop materially. I had an
one year, and, after haying, the weeds began to show themselves
lds. My man went through the line and pulled up the large

weeds, and in getting them out there was a large quantity of leaves brol which he raked out. On another part of the field he did not go, and those ro continued to grow late and large, when, upon the first-mentioned piece v he had raked out the weeds and leaves of the mangolds, they stopped gro and seemed to look like blasting, and never recovered their usual bright g and thrifty look. I can say the same in cultivating late in the season a the roots generally; it injures their growth, breaks down and bruises the lea and causes them to blast and grow brown, from which they never recover.

TURNIPS.

The most valuable crop of the root kind, I think, is the Swedes or ruta baga, but the most difficult root to keep in large quantities, unless one has a barn cellar well ventilated. They are quite a sure crop; do not need quite as rich ground as the mangolds. They will grow to a very large size, and more weight to an acre than any other crop of roots; are better adapted to feeding to sheep and young cattle than to cows that are in milk. The seed needs to be sown early in June, using about one pound to the acre, in drills at least two feet apart, and, if the ground is rich, not less than one foot in the rows. When they first come up, or soon after, when the plants are small, it is a good practice to take common wood ashes and sprinkle them all along in the rows and on the plants. There is sometimes a small fly that will destroy a whole field of them, but I have never been troubled with them, using ashes, as above described, when my neighbors complained that "the fly" had eaten theirs all up, and they were obliged to plough up their ground and sow to something else; and the same I can say of using ashes on my beets.

A sandy or gravelly loam is the best adapted to the growing of this root. It should be well ploughed, harrowed, rolled, and made free from lumps. The manure should be well worked over and made fine before using it, and then if well ploughed in, harrowed, then cross-ploughed, it will surely increase the crop. The ruta-baga should be treated, in the season of its growing, like the mangold. Many careless men think it no harm to jam through a field of ro corn, or potatoes, stepping on the hills, breaking down the stalks, &c., l their mark as they go. It does the growing crop a great deal of injury. Th young and tender plants cannot stand such harsh treatment, and flou yield a good crop. The ruta-baga has more fattening quality in it than any o the root kind. They will fatten a bullock quicker and cheaper than anythi else, not excepting grain. The meat will be more juicy and tender. The b piece of beef, I think, I ever had was from a three-year-old heifer, fed wi these roots; after coming up from the pasture in the fall in good condition feeding twice a day upon roots and what hay she would eat. She was fed i this way till within two weeks of the time of slaughtering her; then she wa fed upon corn-meal and less roots till the last week; then she was fed upo clear meal and hay. Being fed in this way the last part of her life, prev the turnips from imparting any unpleasant flavor to the meat. If our ne England farmers would plant only a small piece for this crop, for this espe purpose, they would find their beef fattening better and at less expense. I tend growing enough of ruta-baga the coming season to fatten all the beef a mutton that I shall want to turn in the fall and winter. The fattening of an mals in the winter, and keeping them late, till February and March, witho giving them much grain, and getting a high price for them, as is usual at t season of the year, makes it a paying business in the matter of dollars a cents; and then, too, the manure made from these animals is of great importa to the farmer, and he will find his account in the practice.

FLAT OR ENGLISH TURNIPS.

My experience in growing the flat turnip has always been satisfactory. The are grown in drills, and large crops are gathered; but my usual practice

to sow from three-quarters of a pound to one pound of seed to an acre in
i fields. At the last hoeing of corn, after going through the fields with
ivator, sow the seed as though there was no corn growing there; then
i as usual. In this way I have grown from 250 to 300 bushels an
large, clear, and clean purple-top turnips, free from worms, which find
sale at thirty-three cents per bushel at retail, or twenty-five dollars per
d. I have sometimes sowed one pound of seed to the acre, but have
it too much. Last season I had an acre of grass land, where the grass
ery light—not more than one ton—which I cut the last of June, then
my team to ploughing it with a Michigan plough; spread upon it about
y bu ls of leached ashes and a few loads of fine manure that were left after
; sowed six quarts each of herds-grass and clover-seed, and one pound
] le-top turnip seed; harrowed it well before sowing the seed, then rolled
rain began to fall in two days after I finished the piece. The turnips
soon began to show themselves, and grew finely; also the grass-seed came
l soon both the turnips and grass covered the ground. This piece of land
was well manured one year and a half before, and sowed to winter wheat;
a fair crop, being a dry piece of land. The grass all dried up, and I
it I would try this experiment; and now for the result. As I said before,
s and turnip seed came up well, so that in some of the richest places on
e the clover grew from two to two and a half feet high, and I mowed a
rop of grass in August, taking the turnip tops as I mowed, and to my
the turnips grew to a very good size. On the rest of the piece I had
e crop of grass and turnip tops, which I mowed, leaving the turnips all
to pull, which the men did very readily, all of those of good size, leaving
r quantity on and in the ground than they pulled. What was left was
up by my sheep when they were brought from the pasture. I gathered
ver one hundred bushels, that did not cost me more than three dollars, which
I am now feeding to my sheep, (February,) and shall have enough to last three
weeks into March. There are many acres of land that can be treated in this
way, and yet the land be well laid down to grass for a large crop of clover next
year, if one has manure at that season of the year to spread after ploughing. The
purple-top turnip is the best, I think, to grow; they do not grow so large tops
by one half, and bottom better and mature earlier.

The feeding of turnips is best adapted to fall and early winter feeding; then
sugar beets come in next for feeding, then ruta-baga, and then mangolds.

I would earnestly recommend to all farmers a more general sowing and rais-
ing of the various kinds of roots, thereby saving a great deal of hay and keep-
ing their stock in better condition.

SUGAR BEETS.

! cultivation of this root is considered by some farmers to be preferable
olds. If the land is made rich there can be a large crop raised upon
. They need the same kind of treatment as the mangolds, are sowed in
manner, and harvested about the same time.

roots are better adapted to early feeding than mangolds or ruta-baga.
rs are extremely fond of them, and they will produce as much milk
or root. I have kept store hogs through an entire winter upon
giving the hogs what slops were made in the house, and sugar beets, cut
raw, given to them at noon. If there was no swill for them from
I gave them roots at night. If the hogs are not fed too bountifully,
them as freely and with as good relish as they would corn. If
for manure-making, this is the best and cheapest food they can
ly fall to late in the spring or summer, throwing a handful of
lly into the manure for them to dig after. To any farmer think-
roots, that has no experience, I would suggest that he should

prepare an acre of ground that had been planted the year previous, and had been well manured by ploughing in a good supply of fine manure about six inches deep, harrow and make it in a fine condition to receive the seed; then sow to the various kinds of roots; divide it off into sections—say one-eighth of an acre to carrots, one-eighth to sugar beets, one-eighth to ruta-baga, and one-eighth to turnips—one-half to mangolds, some of the long red and some of the yellow globe, and to cabbages; and if he will take good care of them, I venture to say he will have the most profitable crop from this piece of any upon his farm.

CARROTS.

It will be useless for me to repeat what has so often been said, that the rot is a most valuable vegetable to raise for the horse and cow. It has cultivated for centuries, and always regarded as a most important root crop; but the question to decide is, whether it is a sufficiently profitable crop for the farmer to give much time and attention to its culture in the United States, where labor is high and scarce, particularly that kind of labor (children's) that is needed and best adapted to weeding and thinning out the plants.

My experience has not been in favor of carrots over other roots; the comparative value for milk-making is not equal to mangolds or the sugar beet; their weight per bushel is less at the time of harvesting than that of mangolds; their shrinkage during the winter is greater, and they do not keep as long into warm weather as the mangolds. I have kept the mangolds till the 10th of August, feeding to my cows and hogs, they remaining sound and brittle as at any time during the winter.

The carrot is a slow grower; the seed should be sown as early as the ground will permit, about two pounds to the acre. If not put in early, the weeds and grass will start first and grow faster; consequently the very small carrot plants will be overpowered by them, and, unless immediate attention is given, it will cost more to weed them than they can possibly be worth. If the planting of the carrot is deferred till corn-planting is over, when the soil is warm, the weeds and grass will cover the ground long before a carrot plant will be se If I were to make an effort to see how great a crop I could raise at the lea expense, I should prepare a piece of sward land by spreading liberally manure in the fall, (late;) plough it eight or nine inches deep; then sprea on ashes or guano, or some fertilizing substance of that nature, (that wi not grow weeds all over the piece,) immediately before sowing the seed, an harrow it well, raking and making it as free from lumps as possible. It is cu tomary for farmers to sow but a small piece of land to carrots, and they m be sowed when they can find time after more important planting is done up the farm. This is a great mistake. To insure success in growing a good a profitable crop more time and care are necessary than for any other hoed cro In summing up my experience in the matter, I should never recommend t cultivation of them on old land made rich with manure, (particularly in Ne England,) except upon a small scale for a farmer's own use for his horses a colts. My experience in feeding carrots to cows as well as to colts and you cattle is in feeding a peck each day to the animals; they never eat any le hay; their appetites are sharper, more regular, and the cattle look and feel great deal better; their hair is more glossy and sleek. I can say the same other roots as to the effect upon their appetite.

In the spring of 1862 I spread upon the grass of one-eighth of an acre t horse-cart loads of manure, and ploughed it in full eight inches deep. Af ploughing, spread a light dressing of compost manure, and gave it a thoro harrowing; raked it, sowed the seed, and had them well attended to; tu came up well, and I harvested 63 bushels of carrots, 30 bushels sweet t nips, that were set out where the carrots had failed, about 20 heads of

bage, and 3 or 4 bushels of potatoes that grew on one edge of the piece. I called the crop equal to 100 bushels of carrots. The cost was less than ten dollars. They were selling for twelve and a half dollars per ton. Forty bushels to the ton would give me thirty-one dollars for the crop, or twenty-one dollars for the use of one-eighth of an acre of land. In the spring of 1863 (having had such good success the year previous) I thought I would try an acre for the profit of it. I measured off an acre, including the piece that I planted the year before. I spread and ploughed in forty horse-cart loads of manure from my barn cellar full eight inches deep; then spread on twenty-four loads of the finest manure I had that had been previously worked over; harrowed the piece with a revolving tooth harrow, raked off all the lumps and pieces of turf, and made a very nice-looking piece of land. It was rather a formidable job to rake and get off all the lumps, &c., from so large a piece, but I told the men the crop in the fall would pay the bill. Sowed the seed the 12th of May in drills eighteen inches apart, which I found during the season, in taking care of them, was altogether too near. I think twenty-two or twenty-four inches for the rows is near enough. Sowed two pounds of seed upon the piece. Notwithstanding my early sowing, the weeds and grass came up first, and I was obliged to stop all other work to attend to the carrots, which made the cultivation much more expensive. The plants being so small the weeds and grass overshadowed them, owing to the manure I had spread and harrowed in near the surface. After being hoed and the weeds got out, I thought I never saw a nicer looking piece of carrots growing, and should have had a large crop, but the dry weather came on in June and everything suffered severely, my carrots as well as all my other roots. In July it began to rain, and then the rain was too much for them, and the whole season was bad for the root crop generally. The last of July the tops began to blast and grow yellow, and my crop I thought was spoiled, as it afterwards proved to be.

The fore part of September the tops revived; the dead leaves had disappeared; the new leaves from the centre began to show a beautiful growth, but to no purpose; the bottoms never grew to any size.

TIME OF HARVESTING.

This should be done before the severe cold and frosty nights, in order to save the greatest amount of tops, as they are very valuable for feeding to the cows that are giving milk. I commenced with a plough and a pair of horses; ploughed round the piece, turning the furrow from the rows of carrots; the men would go along, pull up and pick the carrots as the plough turned them out. This is a very cheap and expeditious way of harvesting them. The ploughing out of the carrots left my land in a beautiful condition to get in an early crop of grain the next spring. From the acre I only gathered 120 bushels of carrots—and quite small they were, too—about 100 heads of cabbage, one cart load of pumpkins and squashes that grew near the edges, and about 5 bushels of potatoes around the piece; they, too, failed in giving me a fair crop for the amount of seed planted. So my carrot crop was a failure this year; and, as I have said before, I would not recommend the cultivation of them for a market crop, but would cultivate only a small piece for one's own use. I consider the carrot crop the most uncertain of the root kind; ordinarily there is no money made in growing them.

EXPENSE OF GROWING CARROTS.

on hand an exact account of the time of each man, horse, and the . Charging twenty-five dollars, or about half the value of the . I find it cost me $89 06, which is ten or twelve dollars more for they were more weedy than ever before. If my crop had been crop, I should have received at least $195 for them, giving me

more than one hundred dollars for the use of one acre of land. I call an a age crop five to six hundred bushels; a large crop, eight hundred to the I see it stated sometimes that from ten to fifteen hundred are raised from acre. These cases are very rare, and upon a very small piece of land, they should be no guide; neither should it induce any man to attempt to g the crop for market, as he surely will be disappointed, if he is obliged to the price for labor that is demanded at the present time. The most profit kind for cultivation is the long orange. I have grown this kind and the white on meadow land that had been well drained, to a very large size, a large crop per acre, but found the manure that was harrowed in nearer the face would bring in the weeds. I prefer this kind of land to any other. horses are doing better this winter, as I am feeding them with less grain ever before. I give them one pint of meal each morning and night with hay, half a peck of carrots at noon and a little hay. They are not at much now, but they will be in much better condition in the spring, whe hard work upon the farm comes on, and the grain then will do them good than if they had been eating grain all winter and no work. One of best livery stable men told me he preferred giving carrots to his horses were hard at work every day—half a peck every other day at noon, omi their grain those days—than to give them all grain. He found by se years' experience that this practice was a great advantage to his horses i way of keeping them in better health, better appetite, and their hair sho evident signs that this kind of feeding was preferable to his former practi giving grain entirely and no change of food.

I don't intend to discourage any one from growing carrots; they had b have some land sowed with them for their own use. If farmers could al be sure of the seed coming up well, when sowed on good land, they then be made a profitable crop; but there is so much uncertainty about it t consider it a very hazardous business to attempt to grow them for a m crop on a large scale.

FLAX

Is flax in its various uses more profitable than other farm products? C value of its fibre for cloth the civilized world from the earliest dawn of civ tion is sufficient evidence. For strength, for beauty, and durability, it s surpasses cotton as to be indispensable for certain uses in defiance of all petition. It is grown in a wide range of temperate climates in various while cotton is circumscribed in climate, soil, and conditions of labor. has met with royal encouragement and protection for centuries in Et while cotton assumed kingly prerogatives of its own. Yet flax has not ra advanced in production, though it has been and is a source of wealth fibre, the oil of its seed, and the expressed refuse, so useful in the fe economy of the farm.

Ireland has long been a prominent flax-growing country. It has long the home of pauperism, but the two facts have no connexion as cause effect. The flax of the "Green Isle" is one of its most valuable and prof products. Scotland produces little of it, and England less; yet the few do grow it find that it pays liberally. It is not that England desires less, but that she needs bread the more. With her dense populati labor is a necessity, beef and mutton are indispensable.

If is not largely produced there, it is extensively manufactured, and the in y processes of its manufacture in the rural districts have been of immense m the economy of British industry in particular localities. Observers noted the renovation, through the potent influence of flax industry, of s filled with wretched town hovels, virulent with typhus fever, fester- with indecency and crime, and consumed with pauperism. Each family ucc able to occupy a commodious cottage, disease was banished, pauperism ned, illegitimacy became unknown, schools flourished, industry prevailed, the condition of residents was immeasurably bettered, through the social physical amelioration from the profits of flax-growing and preparation of

It afforded profitable labor to children, women, and aged and feeble persons, whose wages increased the common fund instead of preying upon the earnings of able-bodied members of the family, and who would otherwise have been compelled to eat the bread of idleness and charity. Persons accustomed to depend for supplies upon the "union houses," were enabled to live comfortably on their own industry, and to accumulate respectable savings.

These examples have not made England proper a great flax-growing region, mainly because English proprietors, who rent to farmers, have entertained the idea that the crop is an exhaustive one. This impression is now wearing away, and the objection will henceforth be comparatively inoperative.

The same necessity does not exist in the United States for employment suited to children and infirm persons who are compelled to labor. Labor of all kinds is here in demand beyond the ability of the country to supply. Abundant testimony exists showing that the crop has always been profitable. It is now far more profitable. The advance in seed from one dollar to three per bushel, and a general demand for fibre that was formerly thrown away in a large section of the country, has given an impetus to production, and an enhance- ment of profit gratifying to the political economist, who desires the success of present efforts to make this a great staple, feeding an extensive manufacture.

Among instances of successful culture that may be referred to, is one in Henry county, Illinois, where, upon two acres of prairie, well ploughed, and sowed with one bushel of seed, thirty-five bushels of clean seed and two tons of straw were produced, the straw yielding eight dollars per ton. It was cut by a machine, and the seed separated by the trampling of horses.

In Boone county, Illinois, three and a half acres yielded thirty-five bushels of seed, and five tons of straw, at a cost of $47; proceeds of seed, $96 25; of straw, $50—a total of $146 25. Net profit, $99 25, or $28 35 per acre.

These specimens of prairie culture, with no more expenditure of labor than in cultivating and marketing wheat, producing net returns equal to two-thirds of the gross receipts, are certainly more encouraging than the yield of fifteen bushels of wheat costing at least two-thirds of its highest returns. That care- ful culture and proximity to manufactories will secure better results is shown from an experiment in Worcester county, Massachusetts, where 136 square rods, or a trifle more than five-sixths of an acre of old, sandy pasture, with the aid of 130 pounds of guano and 13 loads of barn-yard manure, gave a total pro- duct of $148 20, at an expense of $54 58—a profit of $93 62. This is almost identical in gross and net returns with the three and a half acres of prairie, and shows that laborious culture and adequate fertilization are sufficient compensa- tions for superior fertility.

It w l seem, then, that at present prices flax should be considered largely ive. The great drawback now, as heretofore, is the amount of labor the preparation of the fibre. For the progress made in processes of are and improvement of flax machinery the reader is referred to the on l flax commission, soon to be published. It is certain that flax rth be cut instead of pulled, either by the reaper, and carefully

disposed in gavels, or by the mower for gathering, after the manner
If a profit of $50 to $60 per acre has in former years been made in E
with former processes and machinery, requiring tillage, pulling, s
beetling, breaking, and scutching, cannot Americans be expected to t
its simple culture and harvesting, the manufacturer quickly and cheapl
forming the straw into strong and beautiful goods? If we get less of s
fibre here—400 pounds of the one, and 10 bushels of the other per
do it with far less labor.

CULTURE.

In the cultivation of flax in this country consideration must be give
question of labor, however necessary clean culture and good tilth
The Belgian practice of hand-weeding by women and children on a
with coarse cloths interposed between their knees and the damp ground
admissible. Our husbandry is not yet so systematic that we may pla
as in Flanders, in the third year of a seven years' course, or the fifth
years' rotation; nor can we imitate the clumsy and slow processes of t
sians, whose labor is abundant and cheap; nor can we, except in
remote from factories, and in quantities suited to the wants of home m
turing, indulge in the costly pastime of pulling flax and preparing the
the old way. Flax soil must be well pulverized, but by a rapid as
thorough process; it should be free of weeds, but by clean culture b
or ox power, (or by steam,) of the previous crop mainly; and it mus
by the machine mower, cured, and delivered to a neighboring manufa
as little expense as hay is made and marketed. Farmers will never
very materially the flax product, at least in the present generation, if t
compelled to add to the business of legitimate farming the special kn
and manipulative skill of the manufacturer. And the most encourag
ture in the flax business is the fact that advancing progress in manuf
has already offered a good market to flax fibre thus prepared. Su
"in the rough," farmers stand ready to supply in unlimited quantitie
low prices.

SOIL.

Flax grows well in a variety of good soils; that which has been
recommended is a deep, lively loam, with a clay subsoil. If the s
stiff, or near the surface, it should be thoroughly subsoiled and
drained. The rich loams of New York, that give a vigorous growth of
are there preferred for a flax crop. Timber clearings, with a rich s
from acids, are good; and pasture lands of the better quality are fre
chosen. The conditions requisite are good drainage—that the atm
rather than stagnant water, may occupy the interstices of the soil—
roots of the plant may seek moisture instead of being drowned by it
climate of medium temperature, free from aridity on the one hand, an
posed to excessive moisture on the other, as in some low bottom land
western rivers. Alluvial soil produces a fine crop, if somewhat silicic
not subject to flooding in spring and drought in summer.

DOES IT IMPOVERISH THE SOIL?

This is an important inquiry, which has been answered in the affi
without due consideration of obvious facts. As its seed is saved for oil
fibre for textile fabrics, it has been hastily assumed to be, like tobacco, (
ous grower, which is removed *in toto* from the soil,) very exhaustive.
valuable inorganic elements are phosphoric acid and the alkalies. An
product of flax requires about the same amount of phosphoric acid
and nearly twice as much of alkalies, the former withdrawing from a

(according to McAdam, in the Royal Agricultural Journal) 12.21 pounds
a s, and 5.94 pounds of phosphoric acid, and the latter taking (accord-
ly) 7.5 pounds alkalies, and 6.9 pounds acid. This would show it to
more potash than wheat. But there is a consideration that should not
here. Wheat becomes food for man, and is generally lost entirely
; flax is largely composed of woody structure, which is returned to
The seeds contain much of the remaining inorganic matter; the fibre
a uy obtained from the atmosphere, but about five pounds of mineral mat-
ter e ing in the fibre from a ton of flax; so that if the refuse or cake is fed
t most valuable manure is obtained, and flax may assume a place in the
of crops with positive advantage to the soil it occupies.

It would be a positive benefit in another respect. It is a crop that absolutely compels clean culture. It is an extirpator of weeds. It is usually grown after a root crop, and in Holland and Belgium hand culture is employed to keep down the weeds. If careful culture is given it, and the cake or its equivalent is fed upon the farm, flax will not be found to be either exhaustive or unprofitable.

If grown only for fibre, and cut when in flower, it will be seen to be less exhaustive than wheat.

ROTATION.

The Belgians, Dutch, and Irish are very systematic in their rotations of crops, as we are not; they obtain one flax crop in seven or ten years, usually after a "corn" crop, generally oats, such grain crop invariably following grass or clover. It is held to be an error to make flax follow a potato crop, though it was often grown in New England after corn and potatoes, and did well on old pasture land, well broken, planted in potatoes, and afterwards sown with flax. If planted for the fibre, it is essentially a green crop, and should not, as a general rule, immediately follow one. Hoed crops best precede it, because likely to secure clean culture.

Double cropping is sometimes practiced with flax, which requires only about ninety days to perfect it. Carrots are frequently sown in drills with it in Belgium, and being carefully weeded with the flax, they are in vigorous condition when the flax is removed, and come rapidly to maturity. Again, after the harvesting of flax, some farmers in Ireland plough and harrow in a mixture of guano and gypsum, and sow with rape. In this country barley has frequently been sown with flax. One instance is recollected in which two bushels of barley and one of flax were put into an acre, the product harvested together and threshed by machine, yielding thirty bushels of barley and fifteen of flax. Other land on the same farm, of equal fertility, yielded but thirty bushels of barley alone. In another instance the past season one bushel of seed sown with barley over five acres produced fifteen bushels of seed without apparent injury to the main crop. These double crops are only desirable in a labor and land-saving point of view, and when additional fertilizers make good the excessive draught on fertility. With niggardly supplies of manure the farmer would lose by it; with skilful and high farming, he might grow two crops at the cost of cultivating one, and thus save by it.

PREPARATION OF THE SOIL.

soil should be as fine, deep, and clean as possible. It should, of course, only when free from excessive moisture. The amount of plough- narrowing must depend not only upon the nature, but upon the con- soil, and should stop only when the ground is in good tilth. On e loam one ploughing might answer, two would be better; on very are received. It is well to plough stubble in the fall, throwing

it into ridges to secure the amelioration of freezing, with surface dr off the water; and then plough and harrow early in the spring, before sowing if possible. It should be rolled to give consistency an surface. While such preparation is necessary, in most instances, t fact is that many American farmers only plough once in the fall a in the spring.

MANURES.

The principal reliance for manures is in the application for th crop; yet many apply well composted manures directly, and special such as ashes, plaster, and salt, and sometimes phosphates. One bu of plaster, salt, and ashes per acre has given satisfactory results. gredients, with somewhat larger quantities of bone-dust and sulphat nesia, constitute the formula of Dr. Ure. These special manures given as a top dressing after the flax is up.

SEED.

Riga seed is best. Ours is apt to make coarse and bushy plants. in rich soil, and do not use seed enough. It will be a long time outgrow this habit of producing heavy seed and worthless fibre. It plump, bright, and glossy, and be thoroughly screened free of all w Instead of a half bushel to a bushel, as in the west, or a bushel t and a half, as in New York, it will be necessary, for the productic fibre as is produced in Holland, if we ever make it, to seed still n ally. To produce such fibre as our manufactories are now working York measure is quite small enough.

SOWING.

The seed should be put in as soon as the soil is dry enough to unless danger is apprehended from frosts. In compact soils, the se sown, may be harrowed in; if prairie, it may be rolled in; in loc New England it is bushed in. The seed should not be placed mo inch in depth.

OTHER FIBRES.

Few people not engaged in the trade or manufacture of fibres ar the immense quantity of coarse fibrous material now used for cc bagging, for various heavy fabrics, and even for admixture with sil finer class of goods. Of the different kinds of raw material from wl have been manufactured, only a few of the most common will here be

HEMP.

Cannabis sativa, known popularly as hemp, is, next to flax, the m sively used of this class of fibres for cordage, bagging, sail-duck, goods.

Our product of hemp in 1850 was 34,871 tons; in 1860, 104,480 t imports of "hemp"—not exclusively hemp proper, but "Manilla" substitutes—have recently been as follows:

	1859.	1860.	1861.
.....	$106,396	$77,810	$63,215
.....	24,202	12,258	21,992
gs.....	731	595	.....
.....	3,387	20,952	16,748
manufactures	298,030	657,520	490,537
nufactured.....	405,173	325,846	253,601
ow	13,719	7,857	15,063
Total	851,638	1,102,838	861,156

In 1862 the import of Russian hemp was $264,356; Manilla, $871,017; jute and coir, $122,369; Sisal grass and other cordage material, $23,635; yarns of different fibres, $32,144; cordage, $29,195; gunny cloth and bags, $234,201; hemp carpeting, $42,114; burlaps, $537,911; sail-duck, $228,606; Russia sheetings, $126,060; grass cloth, $47,505; other manufactures, $254,796. Total, $2,813,909.

JUTE,

the use of which has increased wonderfully in the past year or two, is a fibre produced by the *Corchorus olitorius* and *C. capsularis*. It is grown mainly in India. It is an annual, with smooth stems, growing five or six feet, and sometimes attaining a height of ten or twelve feet; has small yellow flowers, succulent leaves, sometimes used as pot-herbs. They are thus used in Egypt and in Asia Minor; hence the name "Jew's mallow." It has a low habit in Judea compared with its magnificent proportions in India. It is sown in April or May, flowers in the rainy season, and ripens its seed in October and November. It has long been cultivated in India and China for its fibre, which is separated by maceration, and used not only for cordage and gunny-cloth, but for paper-making. It produces from 400 to 700 pounds per acre, and a winter crop of tobacco or mustard-seed follows it, when the soil and elevation are suitable. It was formerly sold at a very low price, realizing in the English market about $75 per ton.

The export of jute from Calcutta in 1851 was 29,000 tons, valued at $875,873, and of gunny-cloth an amount still greater in value, or nearly two millions. The increase since that date has been very rapid. Our jute imports (as seen in the paragraph on hemp) amounted in 1862 to about one-third of a million of dollars. The imports of jute into England for the same year were 969,943 cwts., valued at $4,698,730, or $96 per ton. Besides, imports of jute manufactures amounted to $1,154,605. Thus a fibre almost unknown a generation ago has increased its products from thousands to nearly as many millions. Jute and its manufactures have almost attained the magnitude, in the English schedules of imports, of the hemp interest.

The price of jute in England, at last advices, ranged within $100 and $145 per ton.

SUNN.

The true hemp is little grown for fibre in India, except to some extent in ıtainous region. It is everywhere cultivated, however, for its intoxiquality. By "hemp" is sometimes meant sunn, *(Crotolaria juncea,)* nes the brown hemp, or *Hibiscus cannabinus*. The latter is the ıp," though this name is incorrectly applied to sunn. The exports

from Calcutta are mainly of the *C. juncea*; from Madras and Bengal, *H. c nabinus* mainly, and the western shores of India. The flowers of the la are large, of a sulphur yellow, with a brown centre, having a resemblance those of the mallow, the hollyhock, and the cotton plant. Its fibres are s times five or six feet in length.

The sunn is a leguminous plant which bears a close general resembla to the Spanish broom, with leaves usually from four to eight feet, and ol attaining ten to twelve feet in height.

It requires a rich upland soil, without clay; sown in June, and cu August and September; sometimes sown in October and cut in April. T yield is from three to ten hundred weight. It is steeped, and then beaten washed in water. Twenty years ago, in England, it sold at £18 per ton w Petersburg hemp was worth £38, Indian brown hemp £20, and jute £ Ten years since the prices were: Petersburg, £60; Indian brown, £40; I £30; jute, £23.

MANILLA.

The Manilla "hemp," which figures so largely in commercial tables, i species of wild plantain, *Musa textilis*, grown mainly in the Philippine isla It is very durable, and lighter and cheaper than Russian hemp. In 1862 than ten thousand tons were imported into this country at an average cos $104 per ton. The natives find in its preparation a source of comfort comparative wealth. All of the plantain and banana tribe abound in fi which is obtained from the leaves by scraping away the pulp, washed, boiled in an alkaline lye.

The Sisal hemp, a fibre somewhat resembling Manilla, is a cheap proc and is an aloe which grows wild in Yucatan.

CHINESE GRASS CLOTH.

The fibre of *Urtica nivea*, (or *Bœhmeria nivea*,) called *Rheea* in the c merce of the east, is stronger than common hemp. It belongs to the br of the nettle family known as "stingless." It is rapidly propagated by ing the roots, when numerous shoots are thrown up, which may be su sively cut down, and three crops obtained, the last of much finer fibre tha others. Beautiful silk-like cloth is manufactured from it. It is so fine s rival the best specimens of flax. There are different varieties of these ne known by different names, in various portions of southern and eastern which are furnishing increasing quantities of fibre for export.

The New Zealand flax, one of the liliaceous plants, *Phormium tenax*, a like grass, yielding twice the amount of strong fibre as flax, is a common a of commerce. The leaves are perennial, from five to seven feet in le sword-shaped. They are cut, macerated in water, and passed under a weig roller.

COIR AND OTHER FIBRES.

This name is prominent in the commerce in fibres. It is from the h the cocoa-nut, or *Cocos nucifera*, and is extensively used for matting, c sail cloth, and a light and elastic description of cordage.

The pine apple tribe affords fibre from its long, thorny-edged leaves, w is woven into the finest fabrics and twisted into fishing lines. One varie used in the West India islands for making fences for fields. It is much for fishing nets, and as cordage, is superior for holding anchors. In the Pl pine islands there is wrought a variety so fine as scarcely to be visible, which a muslin-like fabric is woven and beautifully ornamented.

The Agaves or aloes, especially the *Americana*, are growing into impo as fibre-making plants. A machine for separating pulp from the fibrous of the leaves is in successful operation.

The *Asclepias*, a very extensive family, abound in fibre, but little used as yet. *A. t cissima* is a small climbing plant, from which bowstrings have nat have lasted five years under exposure to the weather. It is y per cent. stronger than hemp. *A. gigantea*, a plant with broad, s, growing in India. Like the common milk-weed of this country, out a milky juice when wounded, which has been used medicinally as ative in cutaneous affections. From it sugar is also obtained, and a good substitute for gutta-percha prepared. It will grow where nothing an thrive, requiring no culture or water on dry sand. The fibre is ob- ed with some difficulty by peeling by hand and manual manipulation only, r being injurious. It is of unusual fineness and strength, and great value. The Chinese make paper of rice straw, young bamboos, and the bark of the erry. The agaves, plantain, pine apple, and the straw of the cereals, and s of maize, are among the many materials useful for paper-making.

The *Esparte*, of Spain, or *Stipa tenacissima*, is the most successful fibre- ucing grass known, assuming a growing commercial importance. It is for sandals, mats, baskets, ropes, sacks, nets, hurdles for sheep, and paper- king.

Bromilia sylvestris, the silk grass of British Honduras, grows spontaneously in great profusion. It has soft, green leaves, one and a half to four inches wide, and five to ten feet long, with sharp curved thorns along the edge, the upper side of the leaf soft and pulpy, and under side hard and ligneous. Its annual product has been valued at fifteen millions of dollars.

Many other plants, possessing fibrous qualities of value, might be named. The domain of nature is filled with fibres, differing greatly in tenacity, light- ness, fineness, and color, and in other particulars. Their practical value de- pends more upon the facility of separation of fibres than upon ease of culture or amount of product.

SEED OILS.

The demand for seed oils has rapidly increased of late, notwithstanding the expansion of the production of petroleum and coal oils, which are to some ex used for the peculiar purposes of linseed oil.

(own seed product increased from 562,312 bushels in 1850, to 611,927 in . In the latter year the import was 2,754,060 bushels, which was an import for the four years preceding 1861, though considerably larger ne average for ten years. The export of foreign seed in that year was 3,642 bushels, and the domestic export 3,810 bushels, figures too insig- nt to be taken into the account. Leaving 61,927 bushels for seed, the oil product, at two gallons per bushel, would be 1,100,000 gallons, the (being from the British Indies, with the exception of 217 pounds, and in oil) at 2¼ gallons, 6,196,635 gallons, making a total of 7,296,635 gal- of domestic manufacture. Including 402,908 gallons imported, and de- 26,799 gallons exported, there is left for home consumption 7,672,744

1860 the supply of seed produced at home has been constantly aug- while the imports have dwindled to a small point, 186,347 gallons in and 51,212 gallons in 1862. The price continued at a moderate figure 1861; in 1862 the domestic product was higher by at least twenty-five The average price of seed and oil fluctuates greatly from year to year. ial statement of seed exports shows that the average in 1856 and 1861 73 per bushel; in 1859, $1 44; in 1860, $1 40; in 1855, $1 03. In rns show but fifteen bushels were exported, valued at $59.

ring statement shows the average prices at the place of shipment and imported oils, and for exports of domestic seed during eight

Year.	OIL.			SEI
	Foreign.	Domestic.	Re-exported.	Cts.]
1855	$0 62	$0 87	$0 85	
1856	51	91	82	
1857	65	93	63	
1858	58	74	70	
1859	57	81	57	
1860	69	70	75	
1861	66	65	74	
1862	65	83	77	

In England both the demand and the supply of oil-seeds have inc but the supply has by no means sufficed to meet the wants of oil-cr France, Germany, and Italy are enlarging their manufacture of oil, a ding against England to secure it. British imports of oil-seeds (prin linseed and rape) have averaged 11,000,000 bushels per annum for years past. In 1847 the import was but 3,896,280 bushels.

A great variety of seeds are used, most of them to a very limited for oil-making. Cotton-seed, within ten years, has grown into much i ance for oil-crushing, the amount used having increased ten per cent. ir years. A sort of gourd growing in western Africa yields a valuable o its seeds, called eguse oil, of a rich golden color and pleasant taste. It with a clear flame, is an excellent lubricator, and a good salad oil. seeds are white, ovate, compressed, about an inch long, having a nutty resembling a hazel nut or young almond. The natives dry, parch, brui mortar, grind into a paste, and manipulate them by repeated heati squeezing, until the oil is exhausted, which they sell at fifty cents to o lar, according to produce and season. The trade in African ground- assuming a magnitude of which few are aware. Gambia alone exports tons, worth $675,000. Sunflower-seed is produced in Russia to a cert tent. It yields at a fair average fifty bushels of seed per acre, capable ducing as many gallons of oil, and an oil-cake said to be worth more th from linseed. Seeds of mustard, colza, hemp, and gingelly, and pop brought from the East Indies to some extent for oil. Among other sec ducing oil may be named niger-seed, castor, and camelina; among fru olive, walnut, palm, cocoa, wohwa, etc., the latter salad oils or ve butters.

CONTINENTAL SUPPLIES.

Russia stands at the head of flax-growing countries. Austria, Franc land, Prussia, Belgium, and Holland follow in order. It is estimated Russia one and a quarter million of acres are devoted to flax-growing. years ago the exports of dressed flax amounted to 84,745 tons; in 1860 but 72,901 tons. The diminution of exports is due to the increase of m turing at home; and the recent cotton famine has increased this home d for textile fibres, and rendered Russia a precarious dependence for Briti mills.

The extensive shore-lines of Russia, with a moist atmosphere an loamy soil, and the abundance of cheap labor, give advantages to Russia scarcely any other nation enjoys for the production of flax. Yet it m be supposed that Russian material is the best; at least two causes u render it inferior either to that of Belgium or Ireland. The climate a of Russia are better adapted to coarse fibre than either of those countrie

y ... 1 careless flax-growers, leaving both seed
e.

...duct of Russia has been officially estimated at 361,156,068
...ounds per acre, in addition to a considerable quantity in the
grown for seed and for fuel. Almost one hundred fold the
nax-fibre product is thus produced in Russia.

of seed from Odessa alone are reported for 1860 at 1,182,574
a at ,748,715, or $1 48 per bushel. The price has formerly
o 25 per bushel. The total exports for 1860 were 9,771,666
ax for seed was exported in the same year to the extent of
sent mainly to Belgium, France, Ireland, and the German states.
s have recently imported large quantities of first-class spinning
y, and engaged skilful foreigners to manage it. They are obtaining
monopoly of the trade in ships' cordage. As early as 1824 the linen
ure in Russia amounted to $2,338,300.

re and manufacture of flax have long been important branches of
industry. The manufacture is mainly done by hand in the houses
ts, and is a more extensive interest than any other manufacture.
product of fibre is about 190,000,000 pounds.

Holland, and Belgium flax culture has attained its highest eleva-
finest fibre known to the manufacture is produced. The soil is
to a uniform texture, with all the care and labor applied to the prep-
of len plots. Manures are supplied, through the highest skill of
y, to supply deficiencies and equalize excesses of the various
s.

h owledge that a better system of cultivation must be secured,
ver expect to compete with Belgium in the production of fine
cambric manufacture.

ts from Belgium and Holland have of late greatly increased, with
ng increase in manufactures. England received from Holland, in
tons; in 1860, 7,441 tons; in 1861, 6,170 tons; from Belgium, in
71 tons; in 1860, 6,273 tons; in 1861, 6,501 tons.

product of Great Britain is mainly the growth of Ireland, a coun-
te, soil, and conditions of labor, well suited to flax culture; yet
subject to sudden and wide fluctuations. When grain is high,
flax is diminished; when low, the farmer sows more flax. It is
all farmer, pulled, steeped, scutched, and cleaned by his wife
, its proceeds serving to keep the wolf from the door of his lowly
o add to the comforts of his home.

is there fluctuation in the acreage, but the yield per acre is quite
as the extent of area sown, as may be seen by the following table:

Year.	Acreage.	Yield per acre.
.....	151,403	526 pounds.
.....	97,075	395 pounds.
.....	106,311	321 pounds.
.....	97,721	429 pounds.
.....	91,646	443 pounds.
.....	136,282	556 pounds.
.....	128,595	.....
.....	147,957	.....
.....	150,070	.....
.....	214,092	.....

The yield of the Irish crop, in 1863, is estimated at 60,000 tons, the inc in acreage being 41 per cent., and the product per acre unusually large, makin an aggregate at least double the annual average for ten years past. Its va is estimated at $20,000,000, at $333 per ton. There are now 650,000 spind in operation there, which will use 40,000 tons, leaving 20,000 tons for English mills.

Continued efforts will be made, while the special demand for textile fibr exists, to increase the amount of the Irish crop, which is not only more ski fully cultivated and prepared than the Russian, but is a stronger article.

A hint at the value of this interest to a community is illustrated by the fa that in the province of Ulster, Ireland, last year, the flax product realize $20,000,000 to the farmers, and when manufactured within the provinc $165,000,000. The province has a population of two millions.

In Ireland, as in this country, the hinge upon which flax production turns the success of improvements tending to diminish the cost of preparing the fibr In 1847, when the processes of Schenck and others led to the hope that scutc ing machinery would be dispensed with, there was a *furore* for flax-growin and a subsequent disappointment when those improvements failed to supersec tedious hand operations. For several years there was a disinclination to exte the business. The desired facility of preparation is not yet attained, thou great improvements have been made in machinery. The Rowan machine f scutching dispenses with the skilled labor necessary with the old machine and has been operated successfully by a little girl.

At present prices flax culture is found extremely profitable in Ireland. has, in fact, always been profitable there. At a meeting of the tenantry of Earl of Erne, on his estate, in the county of Fermaugh, Ireland, during la winter, the earl read a letter from a tenant showing the receipt of $400 fro 24 cwt. 2 qrs. 20 lbs. of flax grown upon a little more than two acres and half. He also introduced the following, furnished by Mr. Weir, his manag of a distant estate, as the cost of cultivating one Cunningham acre of flax:

	£	
Two ploughings and harrowings	£1	0
Sowing, rolling, and weeding	0	2
Pulling	0	8
Carting to steep and placing in ponds	0	10
Taking out to steep and carting to spreading ground	0	8
Spreading	0	5
Lifting and stacking	0	5
Scutching and breaking	1	15
Carting to mills and market	0	6
Seed	2	0
	7	0

An average product would be 5 cwt., worth $60 to $100, according to fi ness. Deducting $35 as the cost of culture, a very fair margin is left both tenant and proprietor.

England grows but little flax, her whole agricultural energies being direct to the production of mutton, beef, and breadstuffs. The condition of Scotla is essentially the same, 3,000 to 6,000 acres only being devoted to flax cultu Dorset, Somerset, Norfolk, and Yorkshire have been engaged sparingly in fl culture. An effort has recently been made to increase it, but Englishmen a well aware that their main reliance is upon their colonial possessions, or I land, rather than England, for increase of flax-growing, and hence efforts ha been directed to Canada, northern India, and Australia. Little has been d in the latter country, yet it is said that thousands of acres of wild :

growing there, on river banks and alluvial bottoms, so thickly that it is difficult to tell whether grass, rushes, or flax predominate. It is believed that proper ion will produce there as fine an article as is grown in Belgium. In g beginning has been made, and an Indian flax company has a in Belfast, Ireland. A fibre worth $300 per ton has already mea in northern India.

HOME STATISTICS.

Statement of imports of flax manufactures.

Year.	Manufactured.	Unmanufactured.	Seed.	Oil.	Total.
1855	$8,617,165	$286,809	$1,009,381	$776,097	$10,689,452
1856	11,189,463	132,461	1,741,260	1,063,771	13,126,955
1857	11,441,542	220,738	3,003,824	958,200	15,624,304
1858	6,579,014	197,934	3,243,174	164,757	10,184,879
1859	10,340,784	146,707	2,415,792	695,172	13,598,455
1860	10,736,793	213,687	2,754,060	402,908	14,107,448
1861	7,827,626	171,905	71,786	123,538	8,194,855
1862	4,049,672	175,870	513,585	33,531	4,772,658

The following statement embraces most of the flax products imported in 1863 :

Linens, 35,526,380 yards	$6,348,823
Thread and twine	1,154,876
Drills and Damasks	118,193
Thread lace and insertions	54,933
Other manufactures of flax	365,601
Unmanufactured flax	427,907
Flaxseed, 1,268,554 bushels	1,712,408
	10,182,741

The following are the imports of unmanufactured flax since 1858:

Year.	Flax.	Tow.	Total.
1858	$197,934	$29,691	$227,625
1859	146,707	179	146,886
1860	213,687	458	214,145
1861	171,905	4,961	176,866
1862	.....	.....	175,870

Statement showing our exports of flax products since 1855.

Year.	MANUFACT'S.	FLAXSEED.	OIL-CAKE.	OIL.	
	Foreign.	Domestic.	Domestic.	Domestic.	For
1855	$278,850	$6,016	$739,589	$49,580	$11,
1856	179,666	18,043	1,136,970	57,190	21,
1857	92,930	525	1,186,980	54,144	38,
1858	63,770	.....	1,435,861	48,225	13,
1859	71,582	8,177	1,198,581	34,194	8,
1860	180,611	3,810	1,609,328	26,799	2,
1861	26,372	49,609	1,386,691	27,982	2,
1862	23,200	59	875,841	20,893	3,
1863	.....	96,805	1,277,735	29,861	.....

The average price of seed has fluctuated from year to year. In 1856 a 1861 it was $1 73 per bushel; in 1859, $1 44; in 1860, $1 40; in 1855 was but $1 03. From this latter period until the first year of the war the t tremes are found to meet in 1855 and 1856. The following is an exhibit the prices of seed and oil at the port of shipment:

Year.	OIL.	OIL.	EXPORTS.	SEED EXP'
	Imports.	Foreign.	Domestic.	Domesti
	Per gall.	*Per gall.*	*Per gall.*	*Per bus*
1855	62 cents....	85 cents....	87 cents....	$1 0
1856	51 "	82 "	91 "	1 7
1857	65 "	63 "	93 "	1 5
1858	58 "	70 "	74 "	1 6
1859	57 "	57 "	81 "	1 4
1860	69 "	75 "	70 "	1 4
1861	66 "	74 "	65 "	1 7
1862	65 "	77 "	83 "	3 9
1863	.....	.....	.....	.....

Imports of flax into England.

Place.	1859.	1860.	1861.
	Cwts.	*Cwts.*	*Cwts.*
Russia and Prussia	1,167,297	1,143,516	1,031,
Holland	88,589	148,839	123,
Belgium	99,421	125,474	130,
Other countries	76,730	46,981	49,
	1,432,037	1,464,810	1,333,

The following statement shows the imports of flax and similar fibres into
nd in the last three years, exhibiting a steady increase, except in flax in
which was extensively manufactured at the sources of supply, and hence
not be obtained to meet the demand:

	1861.	1862.	1863.
	cwt.	*cwt.*	*cwt.*
Flax fibre	1,333,679	1,798,351	1,458,962
Hemp	792,054	981,765	1,038,159
Jute	932,638	969,943	1,252,787

OIL-CAKE AND ITS USES.

The consumption of oil-cake for fattening purposes has reached an extraordinary point in Great Britain. It is not easy to ascertain how much of their imported oil-cake is linseed, but it is estimated by good English authorities at one-half. The average importation for eight years past has been 93,000 tons, one-half of which is 46,500 tons. The manufacture of cake from seed has been more than three times as much. The imports of linseed have averaged for eight years 198,000 tons per annum, of which one-fourth is oil and three-fourths cake, leaving 148,500 tons of domestic cake, which, added to the estimate of linseed cake, gives a total of 195,000 tons, valued at more than nine millions of dollars. Including other oil-cakes, the total would be increased to 241,500 tons, swelling the entire consumption of oil-cakes to at least eleven and a half millions of dollars. And this is the average for eight years past, which is much less than more recent figures, as will be seen from the following statement:

	Oil-cake.	Linseed.
1859	95,208 tons.	10,167,288 bushels.
1860	108,826 "	10,644,984 "
1861	113,725 "	9,282,160 "
1862	101,156 "	8,707,776 "
1863	88,566	8,836,624

The average of linseed for eight years (198,000 tons) is placed at 8,529,232 bushels; of oil-cake, 93,000 tons.

The graziers and the feeders are distinct and separate classes in England, as they are beginning to be in this country. While the former must sell, the latter, with heavy turnip crops ripening and broad acres crying for manure, yield to the more imperative necessity of buying, and it sometimes happens that prices of "beasts" and sheep are high, and beef and mutton at the same time low, leaving a small margin for grain and oil-cake, and some prospect of ultimate loss. But these facts do not beget the reasoning that expensive oil-cake should be dispensed with as unproductive; on the contrary, speedy conversion of turnip straw, and grain into meat—rapid fattening—are regarded as the best means of escaping loss, and oil-cake is more than ever required to give impetus to that speed.

noted Alderman Mechi represents the extreme of high feeding there. recommendation of twenty-eight pounds per day for each fattening is laughed at by moderate men, who regarded four, six, and eight as amply sufficient.

WEEDS IN FLAX.

the bane of all agriculture. So wonderful is their power of repro-

prairies and second bottoms, that, (the "last ploughing" being over, and th crop "laid by,") how often the isolated stalks of maize are surrounded an intertwined and choked with dense masses of weeds, not merely impedin locomotion through the cornfield and covering the rash interloper with adhe seeds and insinuating burs, but absolutely, in many cases, barring all progr through the field. How many fields there are in which weeds obtain as mu of nutriment from the soil as is drawn by the legitimate crop! How many bushels of seeds of weeds are ofttimes produced per acre! The prolificacy o these freebooters of the farm is astonishing; the red poppy will ripen 50,00 seeds, the wild mustard 8,000, and the common corn cockle 2,500. Is i strange, with so foul a style of farming as obtains in this country, that weed should abound, that wheat will not average fifteen bushels per acre, and cor is only half as productive as it should be? Even if the farm fields are kep comparatively clean, as a few prompt and persevering farmers do keep them there are roadsides, and manure heaps, and fence corners that furnish a liber supply of seeds, while the free winds are busy and successful in sowing them If a damage to corn and wheat fields, weeds are still worse in garden product and utterly incompatible with flax culture in any degree. And this, whic should be an inducement to grow flax if but to extirpate the weeds, is probabl a prominent reason why it has been so little cultivated. The task is too he culean for the industry and perseverance of many farmers, when natural disi clination is abetted by the high price of labor. The flaxseed that comes fro abroad is very "dirty," having a large per-centage of seeds of noxious wee which have crept in through the slovenly culture of the Russians, and the imperfect means of separating seeds. Common among the weeds found wi flax are the small and great "bindweed," respectively, *Convolvulus arven* and *C. sepium*. It is of a twining habit, its roots penetrating deeply a spreading rapidly, and maintaining their vitality under severest persecutic It has been cut down to the ground repeatedly during a season, only to luxuriant as ever in a month. It is allied to that beautiful climber, the cypre vine, and to the "morning glory."

Cuscuta Europœa.—Dodder, "devil's gut;" *C. epilinum*—flax dodder, fou in all foreign flaxseed. It is a small, yellow, leafless vine, sometimes knov as "goldthread vine," twining around weeds in damp places, in tangled mass like bunches of threads of yarn. Its effect is very deleterious upon flax, stu ing the stem and impairing the fibre. The *Europœa* is common in clover.

Camelina sativa.—"False flax"—"gold of pleasure." The large yell seeds found in flax, with some resemblance to flaxseed.

Sinapis arvensis.—Charlock—wild mustard. It is found in a loamy so such as flax delights in. Sheep eat it with a relish when turned out in t spring, apparently as a condiment. It has long been a pest of the fields. local English poet, of the olden time, was inspired to sing of it:

> "The kerlock plant is a zite to zee,
> As it zhines in the vilds like gold."

But in obedience to his instincts, which led him to betake himself rather poesy than the plough, he despairs of all attempts to eradicate it:

> "But he zays, zays 'e, 'It aint no use
> Vor to go to a girt expense,
> Vor 'twill come agen, whate'er thee does,
> Nor a year or two vrom hence.'"

very prolific, and has been known to produce 8,000 seeds from a sing
It has, too, a very enduring vitality; having been extirpated by yea
culture, on ploughing a little deeper it has again taken possession
eld. An instance is recorded, in which the turf of a very old pastu
ing been pared and burned, there sprang up one of the finest crops
rd.

All seeds of weeds flourishing in a rich loamy soil suitable for flax, may, of
be expected to usurp the soil and surface wherever their seeds are
in con with it, unless the greatest care and cleanest culture are
them.

r voelcker found in one sample of refuse or cake, in seeking adulte-
or linseed, twenty-nine different kinds of weed-seeds, among which are
iently named the common darnel, corn-cockle, (very pernicious in its
upon animals,) the pungent wild radish, wild grape, (a sort of mustard,)
narlock, or common wild mustard.

THE FLAX COMMISSION.

In accordance with the provisions of a law approved February 25, 1863, appropriating $20,000 "for investigations to test the practicability of cultivating and preparing flax and hemp as a substitute for cotton," the Commissioner of Agriculture appointed Hon. J. K. Moorhead, of Pittsburg, Pa., Dr. John A. Warder, of Cincinnati, Ohio, and William M. Bailey, of Providence, R. I., a commission to make investigations and conduct experiments. Subsey, Mr. Bailey having resigned, the vacancy was filled by the appointof Hon. Charles Jackson, of Providence, R. I. The commission has had several meetings, received a large number of specimens, investigated various processes of manufacture, and examined models of machinery, and will embody the results of their researches in a report to be presented to Congress at its next session.

CULTIVATION AND USE OF THE TEASEL.

BY Z. MOSES, MARCELLUS, NEW YORK.

OUTSIDE of the eastern States, it is presumed that a large number of farmers are unaware of the existence of the article, although it is used in the manufacture of all woollen cloth, from the coarsest army blanket to the finest broadcloth.

The writer having been engaged for a number of years in growing and dealing in this truly valuable product, believes that a few words relating to its culture and use would not be uninteresting to the reader of the agricultural reports.

Until within the last fifteen years the factories were mostly supplied with teasels imported from England and France. At present the American teasel, of better quality than the English variety, nearly supplies the market. The first teasels grown in Onondaga county, New York, were raised about thirty years since by an Englishman; and at present, it is believed, they are but little cultivated in this country outside of Onondaga, Madison, and Wayne counties, New York, and some portions of the New England States.

The wild teasel found at our roadsides in certain localities is of foreign deriand by some botanists is thought to be the original of the cultivated ; but it differs from it in this respect, that the points of the burs are and flexible, and are useless to the manufacturer, while the plant a great annoyance to the careful farmer who would have his premises condition.

l of commerce *(Dipsacus fullonum)* is a European plant greatly · cultivation. It is biennial; has a fleshy root which branches

and tapers; an erect, furrowed, and prickly stem, branching near the top, fiv or six feet high; entire leaves springing on the margin and surfaces, those on th stem opposite and joined at the base, and generally filled with water. Scales recurved at the apex, surround each of the florets, which are aggreg burs from 1½ to 4 inches long; when the flowers have faded, these recept having dried and hardened, and possessing elasticity, give the mature the value for which the plant is cultivated. The harder and more elastic the heads, the better the quality of the teasel; hence the farmer should select stiff, strong soil, which is found to be most desirable for the purpose. Good wheat land is generally good teasel land.

Teasels are liable to be winter-killed in extreme cold weather unless pro tected by a covering of snow. From present appearances, it seems probabl that in the State of New York one-third of the teasel plants were killed durin the past winter from this cause. When the plants are very small they ar sometimes in danger of drying or burning up from extreme hot weather. Con tinued warm wet weather is unfavorable to this crop in July, after the blosso have set, softening and rusting the burs.

The seed is planted from April 25 to May 20 in drills 3½ feet apart, an covered by rolling or brushing. They are cultivated and hoed for the fir time about June 10, and should be kept free from weeds during the seaso The first year they spread out near the ground, similar to the bull thistl (Teasels were formerly called "fuller's thistles.")

The second year they are hoed once during the month of May, and thinn from eight to twelve inches apart; where the plants have been winter-kill the spaces are sometimes filled by careful transplanting. The plant rapid shoots up and soon attains a height of from five to six feet, branching out different directions, bristling with teasels, which blossom and ripen from t first to the last of August; those at the top of the stalk, and the largest, a called "kings," and are cut first; the "middlings," or "mediums," grow the end of the branches, and are cut next; the "smalls" at the sides of main branches, and are cut last.

The cutting may be done by men and boys, gathering into baskets, us small hooked knives. Stout clothing and long leather gloves should be wo An expert man will cut ten or twelve thousand per day of the first and sec cuttings.

The crop must be carefully assorted and cured in barns or sheds by spre ing them on rails, and should be frequently handled with large wooden fo to prevent heating, and also to clean them from seed, which falls out easi they are then packed in boxes four feet square at the end and ten feet long

Before using, the spurs and stems are clipped with shears; this can be d with boys' labor at an expense of about 20 cents per thousand. The ma facturers then set them in rows on the periphery of a large broad wheel, wh is made to revolve at a high speed, and in such a manner as to bring then contact with the surface of the cloth which passes over rollers in an oppo direction.

Many substitutes have been contrived of wires and springs, but nothing been found which possesses the peculiar qualities of the teasel for raising nap on woollen fabrics, the teasel points breaking off when meeting with k or irregularities in the cloth, which the metallic cards would tear out. would almost seem as if Nature had created this otherwise useless plant this express purpose. The beautiful symmetry and regularity of the po on the teasel heads, and their wonderful elasticity, seem to mock at the s of man.

"For art may err, but nature cannot miss."

"King" teasels are used on heavy coarse cloths for overcoating and l ets; "medium," or middlings, are used the most, and on any of our

s of woollen cloth; and the "smalls" are used on the fine pant stuffs, in, shawls, &c.

following table shows the labor expended per acre in raising an aver- op of teasels:

	Days horse labor.	Days man labor.
ring ground and sowing	2½	1½
rating and hoeing first year	1	7
rating and hoeing second year	1	3
esting an average crop	1	14
ting, handling, and boxing	.....	1
Total number of days per acre	5½	26½

average crop is 130,000 per acre, of 10 pounds per thousand; instances own where 225,000 have been raised on an acre.

w years ago 75 cents or $1 per thousand was thought to be a very good now, owing to the greatly increased manufacture and consumption of cloths, and the increased price of the imported article from the increase ld exchange and the high tariff, the American teasel brings triple the t formerly did.

will be observed from the foregoing table, the crop is an expensive one, the present high prices it pays exceedingly well. The demand, how- must always be uncertain and limited, depending almost wholly upon ndition of woollen manufactures in this country.

s to be regretted that no reliable statistics can be found either of the nts of teasels consumed, imported, or grown in this country.

POPULAR VARIETIES

OF

THE APPLE, PEAR, AND GRAPE.

BY F. R. ELLIOTT, CLEVELAND, OHIO.

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the Annual Report of the Department of Agriculture for 1862 descrip- of some of the leading varieties of apples and pears were given, and so bly have they been received by the people that the Commissioner has d it advisable to continue the article. Accordingly descriptions of the ng additional varieties have been prepared by the same author, to which led descriptions of some of the most popular and valued hardy out-door . Another year probably cherries and some other variety of fruit will be ced, to the end that in a few years the department will have issued tions and drawings illustrative of all our leading best varieties of hardy

DESCRIPTION OF APPLES.

BELMONT.

Synonyms: Gate, Mamma Beam, White Apple, Kelly White, Waxen.

Fruit.—Size, medium to large; form, irregular, usually roundish, sometimes oblong rounded; skin, thin, smooth, glossy or oily; color, rich clear light yellow, and, when grown exposed to sun, with a clear vermilion red cheek, having mingled many carmine specks, occasionally russet marblings; stem, medium length, projecting slightly beyond the surface, always slender; calyx, varying from small and close to open and reflexed; basin, from shallow to rather deep, always furrowed; flesh, yellowish white, fine-grained, very tender, juicy, sprightly, sub-acid; core, rather large; seeds, ovate pointed, abundant, brownish red; season, November to February.

Tree.—Healthy, vigorous, spreading; wood, yellowish; a good bearer. In the northwestern sections of our States this is one of the apples regarded as almost indispensable, no matter how small the collection; but when grown in the rich alluvial bottom soils of the southern section, the trees are comparatively tender, and the fruit, although increased in size, loses its sprightliness of texture, and much of its outward beauty. It is little known throughout the New England States. Its origin was probably Virginia.

DYER.

Synonyms: Pomme Royal, Golden Spice, Tompkins, Beard Burden, Pomme Water, Bullripe, Mygatt's Bergamott, Bard Apple, White Spice, Smithfield Spice, Coe's Spice.

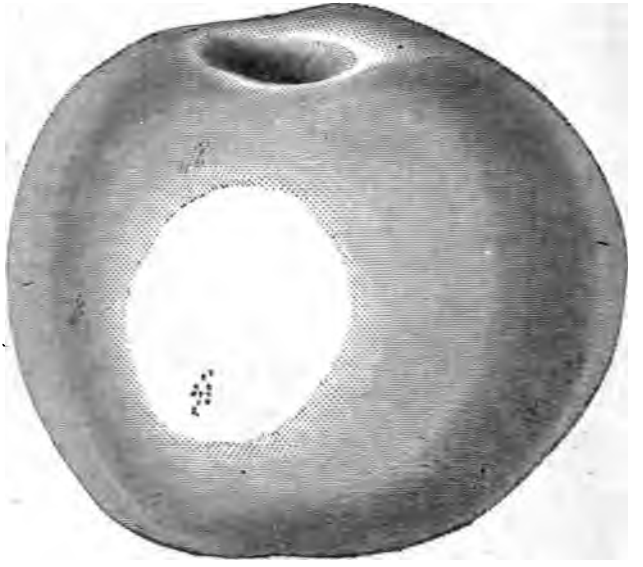
Fruit.—Size, medium; form, round or roundish, flattened; color, clear yellow, with russet marbled more or less over the surface; stem, long, slender; cavity, deep; slightly furrowed; calyx, with long recurved segments; basin, medium; flesh, yellowish white, spicy, sprightly, tender, mild sub-acid; core, medium; seeds, small; season, September to November, but often continues until December. As a table fruit it has few, if any, superiors; but for market purposes its delicacy of skin prevents its carriage without bruising.

Tree.—A fair grower, not strong, shoots spreading irregular, moderately but annually productive; an old French variety originally described as Pomme Royal; but its name having been lost on its introduction to this country, it was christened "Dyer," by which name it is now generally known.

GARDEN ROYAL.

Fruit.—Size, rather below medium; form, roundish, inclining to flat, very regular; color, yellowish ground, with dull red stripes, becoming bright when grown fully exposed to the sun; stem, short, slender; cavity, narrow, acute; calyx, medium to large, open; basin, shallow; flesh, yellowish white, fine-grained, tender, mild sub-acid, rich vinous; core, small; season, last of August and September.

Tree.—Upright, healthy grower, very regular in form, slender, fine-grained, hardy wood, a regular annual bearer. Originated in Massachusetts. As a market fruit its size is the only objection. It is as yet comparatively little known, but wherever known, its superior quality renders it a favorite.

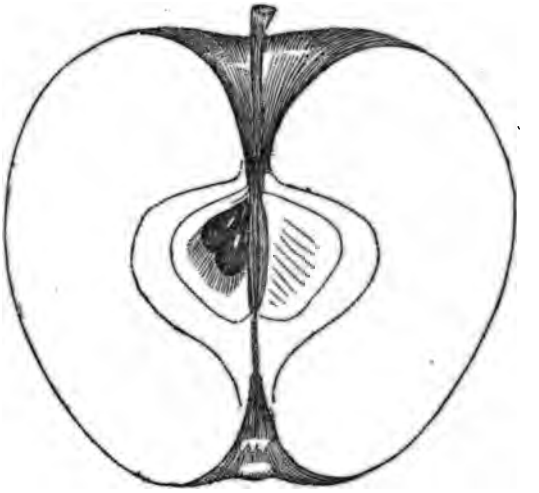


SWAAR.

E.

t, King Philip.

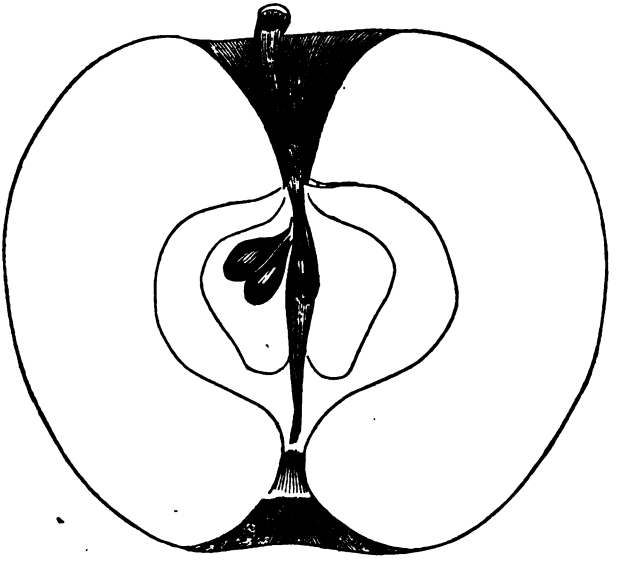
ım; form, roundish conical, regular; color, light yellow overspread, streaked or stained with rich light red, and with a e d(stem, s ; cavi- cayx, small, ; sin, shallow, owed; flesh, yel- , juicy, ıtı rully ma- prightly sub- , ı .um; seeds, wn; season, De- bruary.



- ıardy, slender, ı ly, pendulous ın tive. Origin- on, New York. or ı rket apple, ı apts itself and is deserv- rever known.

SWAAR.

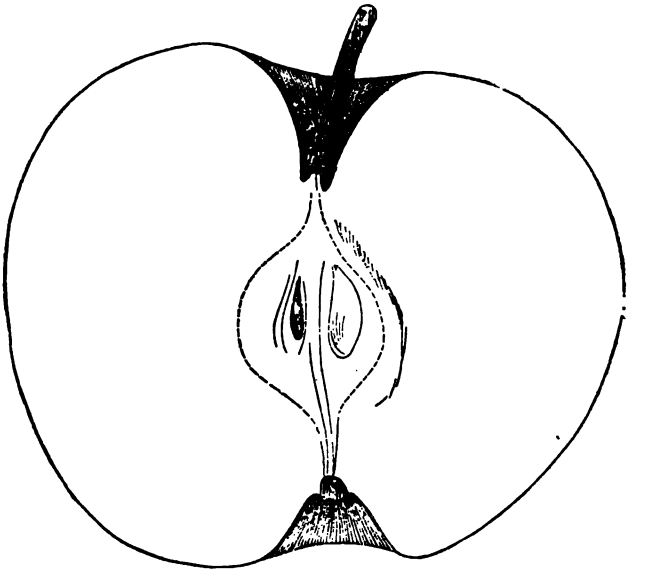
Size, me- ge; form, slightly qual on , and of- ı ular; yel- becoming yellow, n distinct s, some- nied with ıt on the the tin- red; cav- ep; nalf ıl-



tender; spicy aromatic perfume; core, small to medium; season, January to March.

wer, spreading, healthy, adapted to warm, light, and cold, stiff clays; regularly productive, and exceedingly table or market. Originated on the banks of the

WAGENER.



Fruit.—Size, medium; form, roundish, flattened, slightly ribbed at base; color, yellow ground, mostly covered with deep glossy red, with stripes and splashes of light red, and marked with irregular light russet specks; stem, slender; cavity, wide, deep; calyx, small; basin, broad, open; flesh, yellowish white, fine-grained, crisp, juicy, sprightly, vinous, sub-acid; core, small, oblong, ovate; seeds, light brown, ovate, pyriform; season, November to March, but keeps often until May and June.

Tree.—Thrifty, healthy, upright grower, requiring careful and judicious pruning until it comes into bearing, after which it needs little pruning; young wood, pale green; old wood, dark red. Originated at Penn Yan, Yates county, N. Y. An exceedingly valuable variety that has been comparatively unnoticed during the past few years, but sustains a very high character whenever trees have come into bearing.

PEARS.

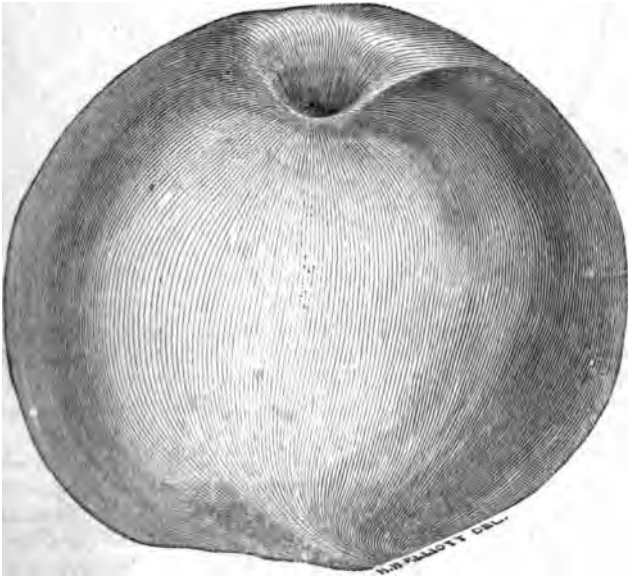
BEURRÉ GIFFARD.

Fruit.—Size, medium; form, oblong, pyriform; color, yellowish green pale yellow; red in the sun, with pale russet specks; stem, medium le slender, curved; calyx, open; basin, shallow; core, small, flesh white, melting juicy, vinous; season, late in summer.

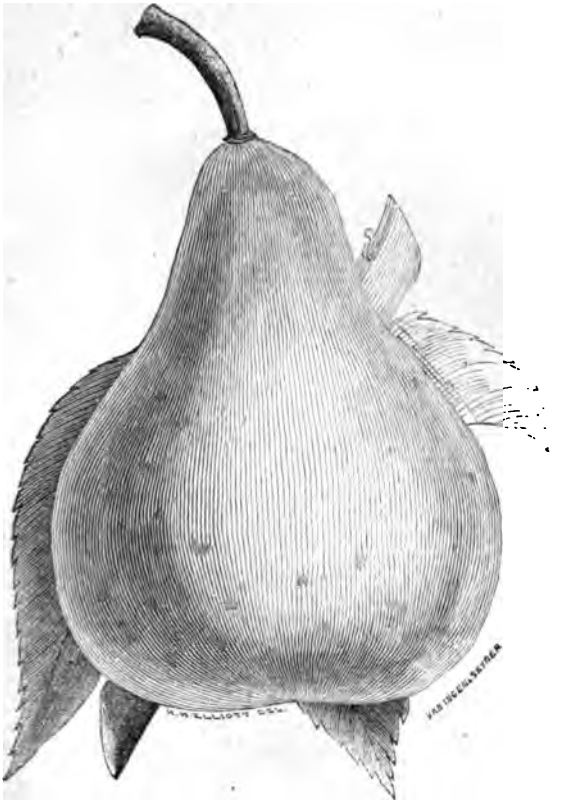
Tree.—A healthy but straggling grower, with long, slender shoots, req ing careful pruning while young to form it into good shape; a good and constant bearer, succeeding either on pear or quince roots. Foreign origin.

BEURRÉ SUPERFINE.

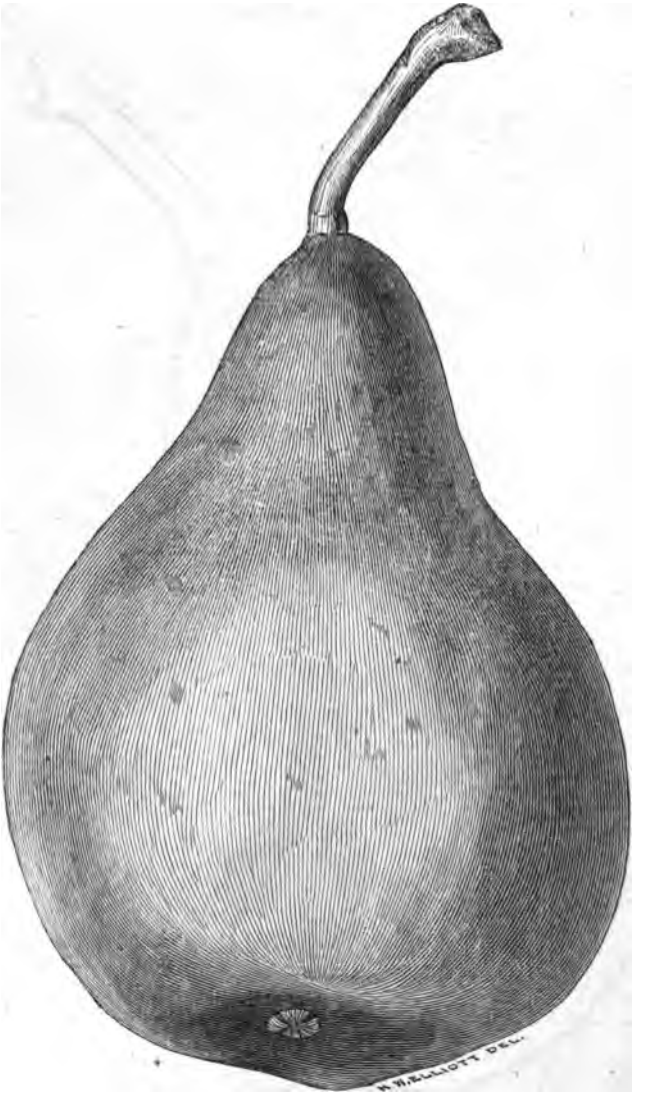
Fruit.—Size, medium or above; form, oblate, depressed, pyriform; c yellow, slightly shaded with crimson on the sunny side, and partially cover with russett, and thickly sprinkled with minute dots; stem, stout, rather inserted without depression by a fleshy enlargement; calyx, closed;



WAGENER.



BUERRÉ GIFFARD.

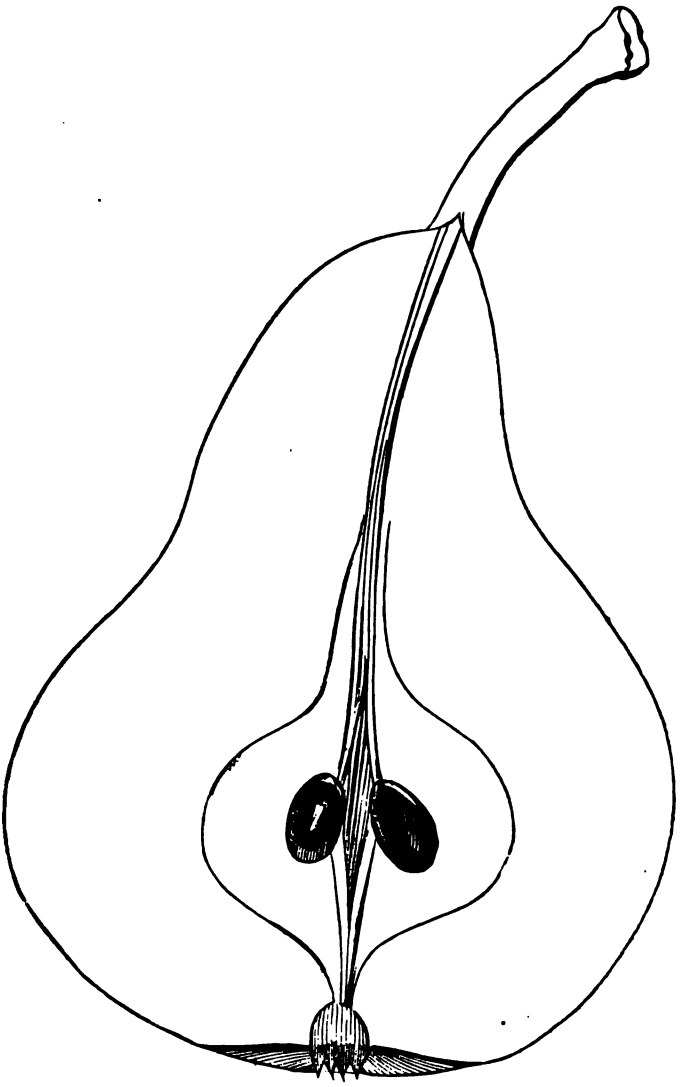


BUERRÉ BOSC.

upt, small; flesh, juicy, buttery, melting; with a brisk vinous or sub-acid **or; season,** October.

Tree.—**Vigorous,** healthy grower, succeeding on pear or quince roots; young **brown,** inclining to a fawn; a good bearer. Foreign origin.

BEURRÉ BOSC.



S ıyms: Calebasse Bosc, Marianne Nouvelle, Bosc's Flaschenbirne.

.—**Size,** large; form, obovate, acute, pyriform, a little uneven, and long and gradually into the stalk; color, dark yellow, dotted, and **with** cinnamon russet, slight brownish red in sun; stem, usually long **er;** calyx, medium; segments, partially erect; basin, round, shallow, **little** uneven; core, small; seeds, blackish; flesh, white, melting, perfumed; season, October.

Tree.—Vigorous, healthy grower, with long, straggling, irregular, brownish olive shoots. Comes early into bearing on the pear roots, and produces regularly and annually fruit of the best quality. Foreign.

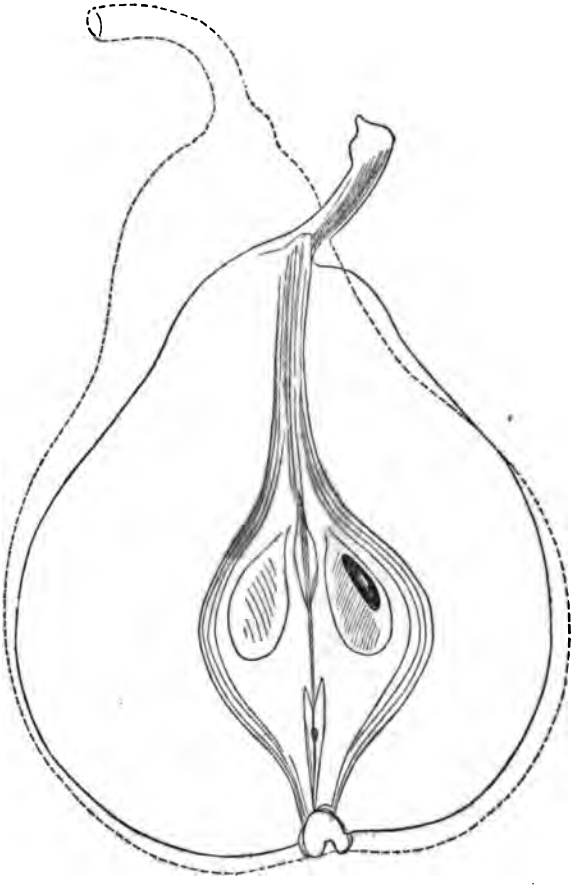
DOYENNÉ D'ETÉ.

Synonyms: Summer Doyenné, Summer Virgalieu, Duchesse De Berry d'I of Bivort, Doyenné d'Juliet.

Fruit.—Size, small; form, roundish, obtuse, pyriform; color, yellowish green, nearly yellow when fully mature, with a bright marbled red cheek on the side exposed to the sun; stem, rather long, fleshy at base, inserted without depression; calyx, small, open; basin, shallow; core, medium; seeds, small, dark brown; flesh, yellowish white, melting, juicy, sweet, slightly musky; season, early summer.

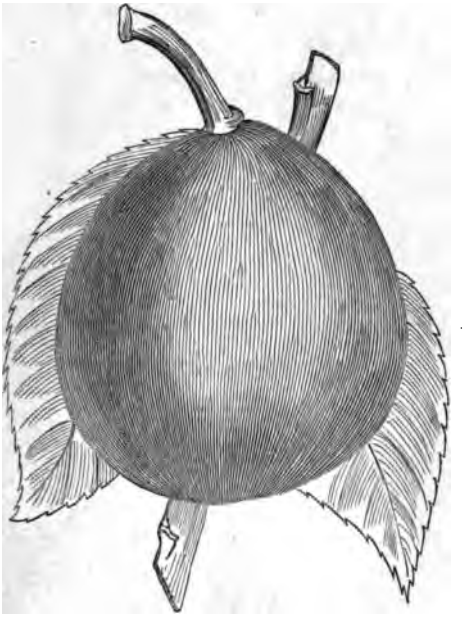
Tree.—Moderately vigorous; healthy grower, with young shoots of a clear olive yellow and pale brown specks; leaves, medium size, oblong ovate, narrow. Succeeds well on pear or quince roots; comes early into bearing, and produces abundantly. Foreign origin.

CONSEILLER DE LA COUR.

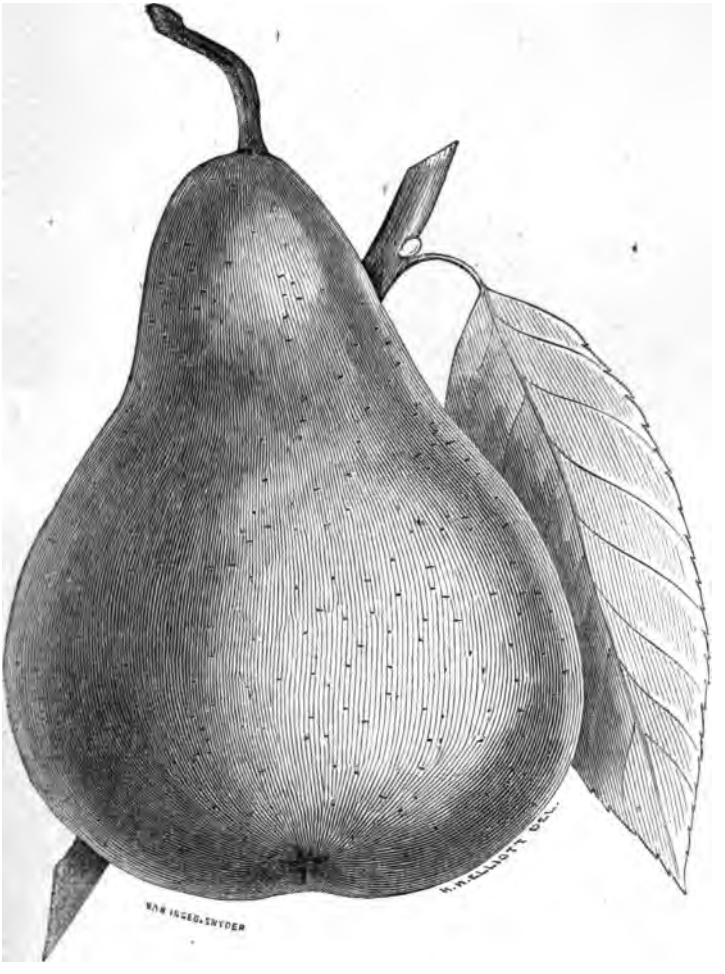


Synonyms: Marechal de la Cour, Duc d'Orleans.

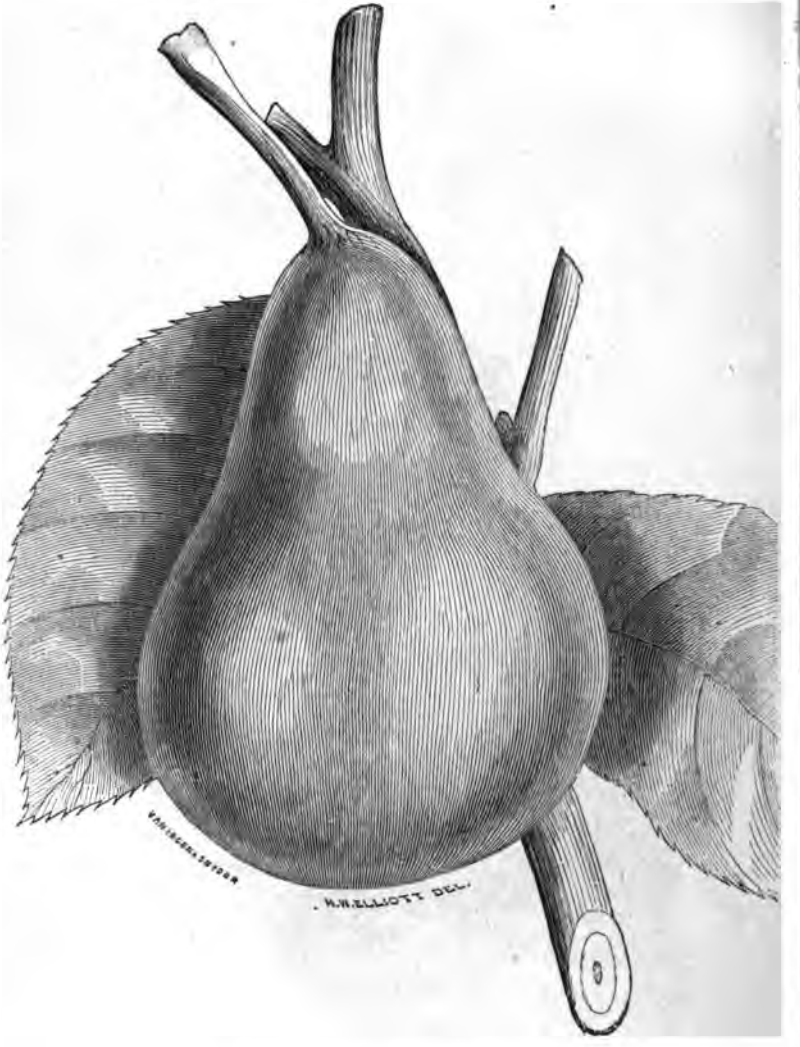
Fruit.—Size, large; form, obovate, oblong, pyriform, irregular; col ish yellow, slightly russeted, small russet dots with green suffi



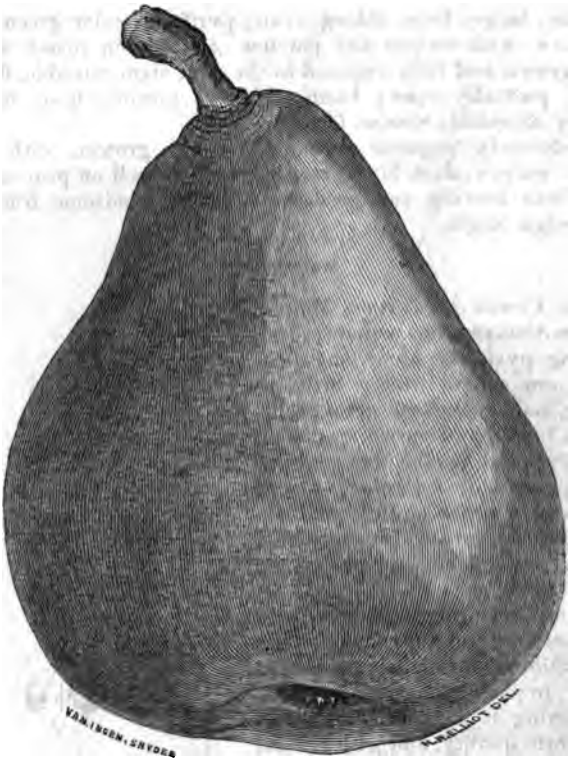
DOYENNÉ D'ETÉ.



CONSEILLER DE LA COUR.



DUCHESSE D'ORLEANS.



McLAUGHLIN.

and marblings of russet, russet at base of stem; stem, without depression; basin, scarcely perceptible; calyx, with ... exed segments; flesh, white, melting; granulous lines around ...d running up to the stem; vinous, sub-acid, juicy; capsules long ...e; seeds, blackish, imperfect; season, November, December.

...—Vigorous, healthy, very beautiful grower, holding its foliage until ... in the season. An abundant bearer, succeeding on pear or quince ...reign.

DUCHESSE D'ORLEANS.

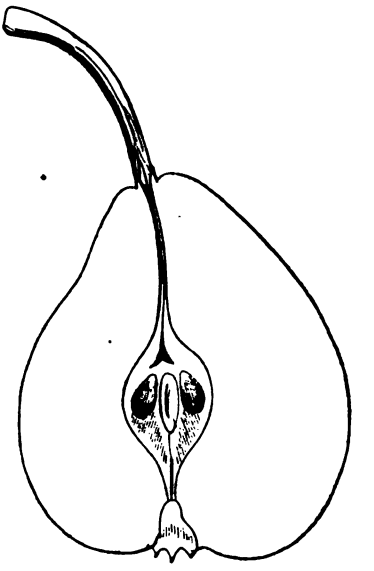
Synonyms: St. Nicholas, Beurré St. Nicholas.

F ...t.—Size, large; form, oblong, ovate, pyriform; color, greenish, becoming ...nish yellow, with stripes and patches of dull thin russet, sometimes red ...k when grown and fully exposed to the sun; stem, variable, fleshy at base; ...x, small, partially open; basin, shallow, uneven; flesh, melting, juicy, ... slightly aromatic; season, October.

...ree.—Moderately vigorous, healthy, upright grower, with olive-colored ...; leaves, narrow, dark blue, green. Succeeds well on pear or quince roots. ... early into bearing, and produces a large, handsome fruit most abun-...y. Foreign origin.

MADELÉINE.

Synonyms: *Citron des Carmes*, Magda-...n. *Fruit.*—Size, small to medium; form, ...vate oblong, pyriform; stem, long, slen-...t base; one side of fruit a little en-...ed; color, pale, yellowish green, a lit-...wi ... blush, and russet specks on ...e ... exposed to the sun; calyx, ...with ...long, persistent, irregularly-placed ...ts; basin, obscure, slightly plaited; ... , all; seeds, ovate; flesh, white, ...y, melting, sweet, slightly perfumed; early summer.

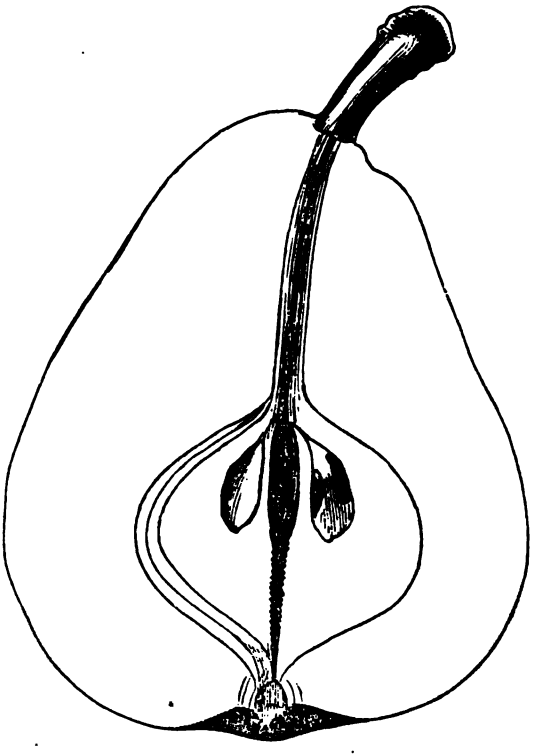


...ree.—A strong, upright grower, with erect, olive-colored branches. Its objection as a tree in rich soils is ...endency to make too strong, coarse ...wth, rendering it liable to blight. In ...f moderate quality, and with careful ...mely heading in, the trees are formed handsomely, and once they come into ...g, produce abundant fruits of supe-...ity; foreign origin.

M'LAUGHLIN.

...—Size, large; form, elongated, obtuse, pyriform; skin, rough; color, mostly covered with russet, which becomes yellowish at maturity; ...rown, exposed to sun, it has a warm, sunny cheek; stem, short, swollen ...n with the tree, inserted at an inclination, with some appearance of a ...x, o... ; basin, shallow, slightly furrowed; flesh, whitish, not very ..., ...ing, sweet, rich, slightly perfumed; core, small; seeds, imper-... ...cember and January.

Tree.—A healthy, moderate, handsome grower, very hardy and produ s; a native of Maine. From some cause, probably the great number of new



that have been introduced the past ten years, this valuable variety has been comparatively overlooked. It should be extensively grown.

NOUVEAU POITEAU.

Fruit.—Size, above medium; form, obovate, obtuse, pyriform, contracted on outside, toward the stem; color, pale green, with many dark green dots, and a few russet stripes and blotches; stem, about one inch long, medium size, set on, and not into, the fruit; calyx, medium, with broad segments, half reflexed; basin, irregularly contracted; core, medium; capsules, long, ovate; seeds, obovate, pyriform; flesh, white, fine-grained, juicy, melting, rich, aromatic; season, last of October and November.

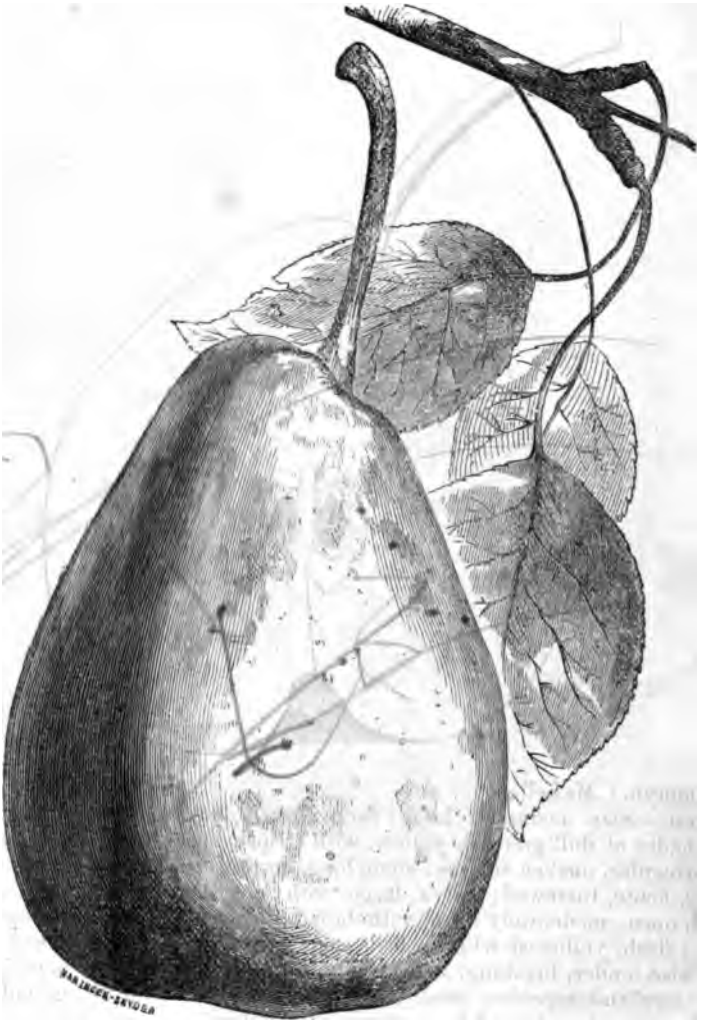
Tree.—Healthy, upright, vigorous grower; an early and productive bearer, either on pear or quince roots. Foreign origin.

STEVENS'S GENESEE.

Synonyms: *Louise de Prusse*, Guernsey.

Fruit.—Size, large; form, roundish obovate; color, greenish yellow, becoming light rich yellow at maturity; stem, rather stout; cavity, narrow; calyx, with short, stiff, connected segments, half reflexed; basin, medium, regular; core, medium; seeds, ovate pyriform, blackish; flesh, white, half buttery, juicy, sweet, aromatic; season, September.

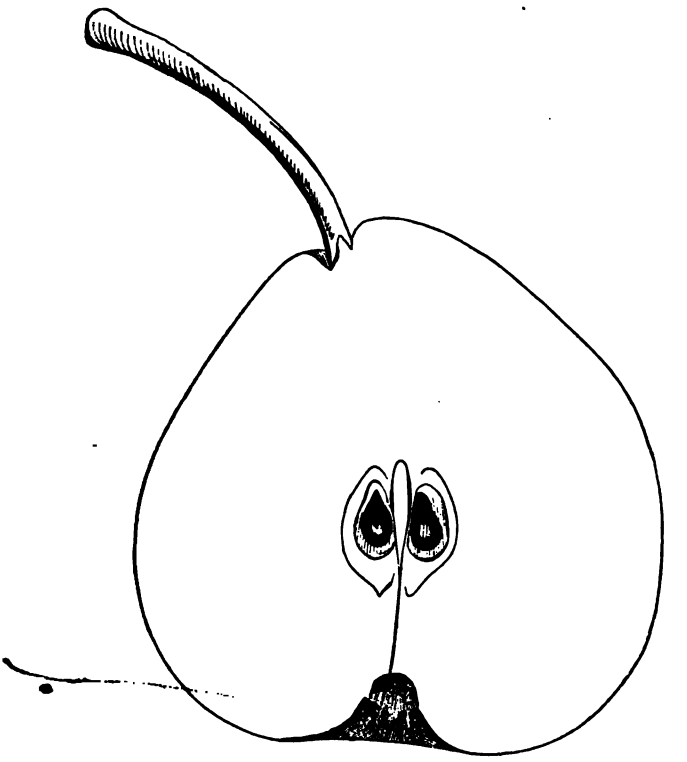
Tree.—A healthy, fine grower, with diverging dark gray shoots. V pro ductive, either on pear or quince roots. For light, sandy soils this v



WHEILDON.

mirably adapted, while in all soils not wet it has long been re-
a e of the most desirable varieties, either for garden or orchard.
ongin, J ngston county, New York. Like the Bartlett, windfalls of this
e often very fine.

WHEILDON.



Synonym: McLellan.

Fruit.—Size, medium to large; form, obtuse, obovate, acute pyriform; color, two shades of dull greenish yellow, with stripes, specks, and marblings of russet; irregular, uneven surface; stem, long, largest at the end that joins the tree; cavity, acute, furrowed; calyx, large, with long segments; half closed basin, broad, open, moderately deep, with broad furrows, two or more forming the basin; flesh, yellowish white, a little coarse-grained and gritty around the core; otherwise tender, breaking, sweet, juicy, highly aromatic, not vinous, but quite rich; core and capsules, small; seeds are only in a capsule, globular ovate, pyriform; season, last of September and October.

Tree.—Spreading, upright, healthy grower; productive. Originated with W. W. Wheildon, Charlestown, Massachusetts, and is as yet but little known. It promises a superior fruit, and we doubt not, like most all our natives, will succeed everywhere.

GRAPES.

ADIRONDAC.

—Bunch, very large; berries, large, round, or nearly so, compactly bunch; color, shining, purplish, black, when fully mature; blue —, medium, not as thick as Isabella, but thicker than Delaw ;

seeds, large, few; flesh, white, little or no hardness of pulp, tender, sweet, delicious; season, last of August and all September, or ten days earlier than the Delaware.

Vines.—Strong, rapid growers; hardy as Isabella, which it very much resembles in leaf and general habit. This variety originated at Port Henry, Essex county, New York, and more nearly resembles the Black Hamburg any hardy grape yet known. As a table grape it has no superior.

CATAWBA.

Synonyms: Red Muncy, Catawba Tokay, Singleton, Arkansas.

Fruit.—Bunches, medium size to large; shouldered; berries, nearly round, large, pale red, becoming deep, almost black red when fully ripened in good soil; lilac bloom covering the berry; flesh, slightly pulpy, sweet, juicy, with a rich, musky aroma; skin, moderately thick; season, October.

Vines.—Hardy, strong, vigorous growers; large foliage, medium jointed, wood reddish, and with downy white spot at base of every leaf.

The Catawba is a native from the Catawba river, in North Carolina, and was first introduced to notice by Major Adlum, of Georgetown, D. C. For many years it has been regarded as the best wine grape in this country, and thousands of acres of vineyard have been planted with it. During the past few years mildew and rot have attacked it in many sections south and west, and some cultivators now hesitate, on that account, to plant it. When it is not attacked by disease, and will mature well, it is superior for wine or table use.

CONCORD.

Fruit.—Bunches, rather compact, large-shouldered; berries, large, globular, almost black, thickly covered with bloom; skin, rather thick; considerable native pungency and aroma; flesh, moderately juicy, sweet, considerable hard pulp; season, last of September.

Vines.—Very strong, rampant growers; coarse, strong foliage, roundish leaf; originated with E. W. Bull, Concord, Massachusetts. The Concord has proved perfectly hardy and healthy in all sections, and as a table sort, when well ripened, it will long continue a favorite where more delicate sorts, or those later in ripening, do not succeed. Some cultivators in Missouri advise it both as a market sort and for wine purposes.

CHARLOTTE.

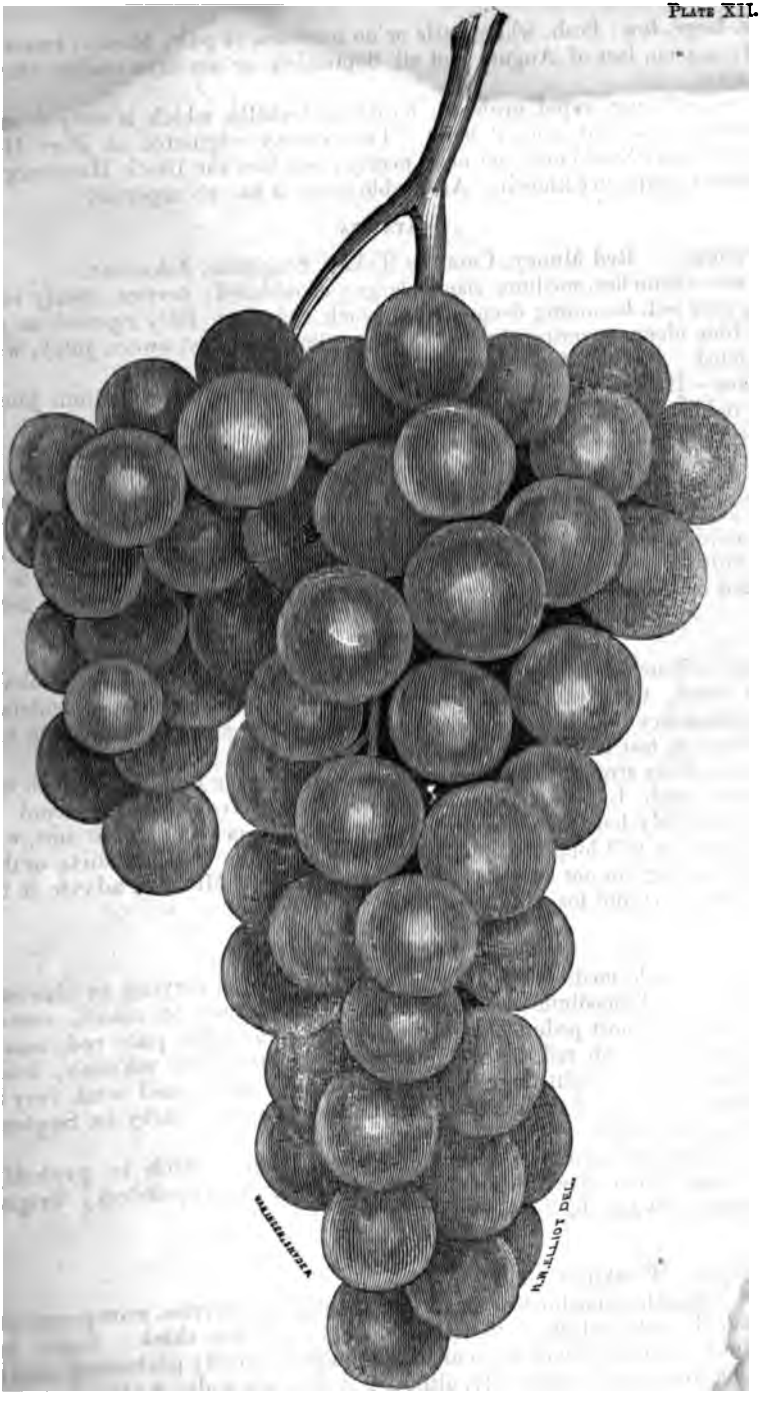
Fruit.—Bunch, medium size, not shouldered; berries, varying in size on the bunch, some full medium or above, others only medium to small, roundish, slightly oblong, short peduncles, very compact; color, light, pale red, many of them a dull greenish red, with a pink, white bloom; flesh, whitish, delicate, sweet, vinous, very slight tinge of the native musky aroma, and with very little pulp; skin, moderately thick, about like Catawba; season, early in September, or same as Dela[illegible].

Vine[illegible] Hard[illegible] vigorous growers, like the Catawba, which is probably its par[illegible] [illegible]; wood, quite dark red[illegible] short-jointed; originated [illegible] island.

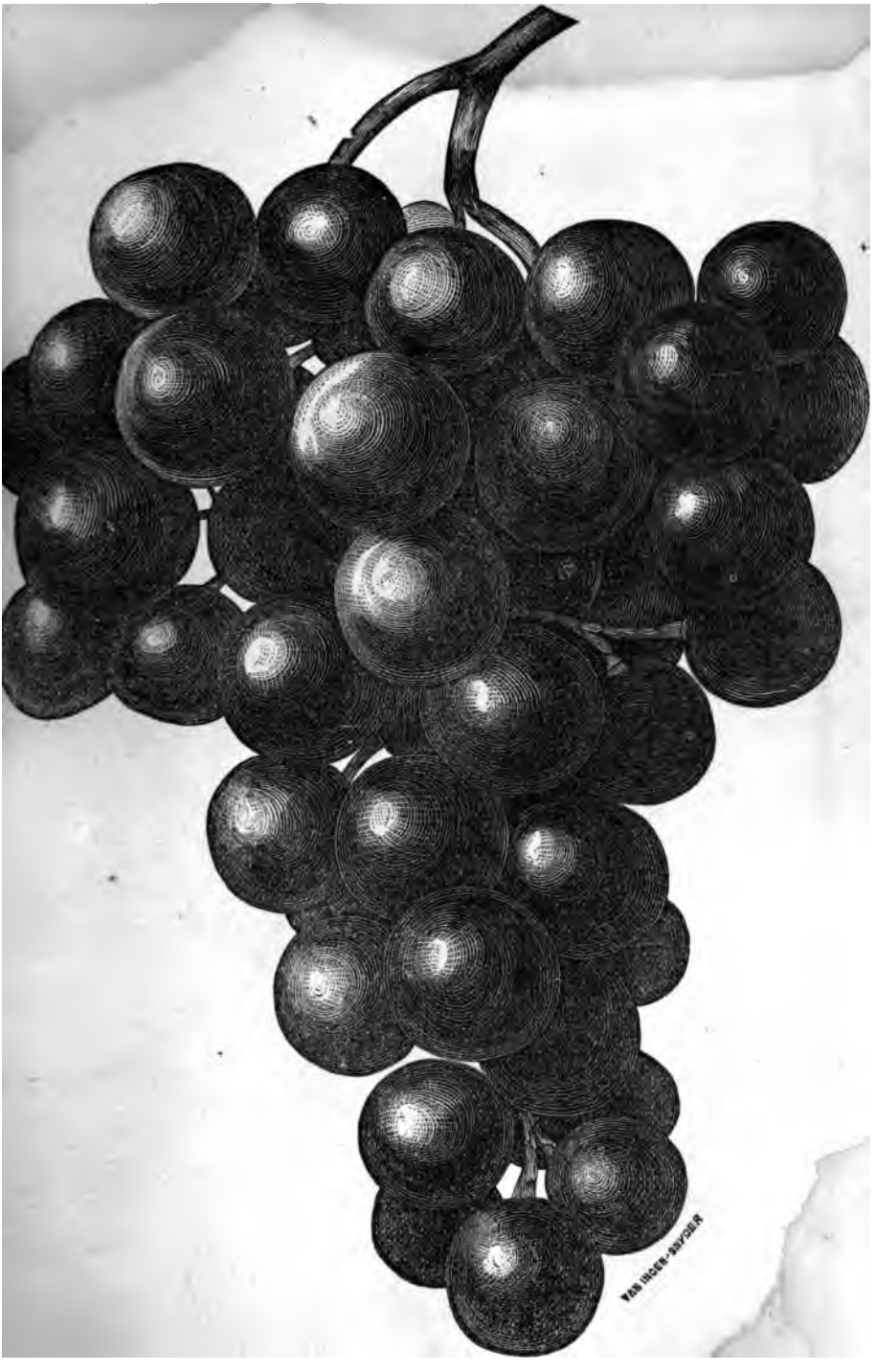
CLINTON

Syno[illegible]

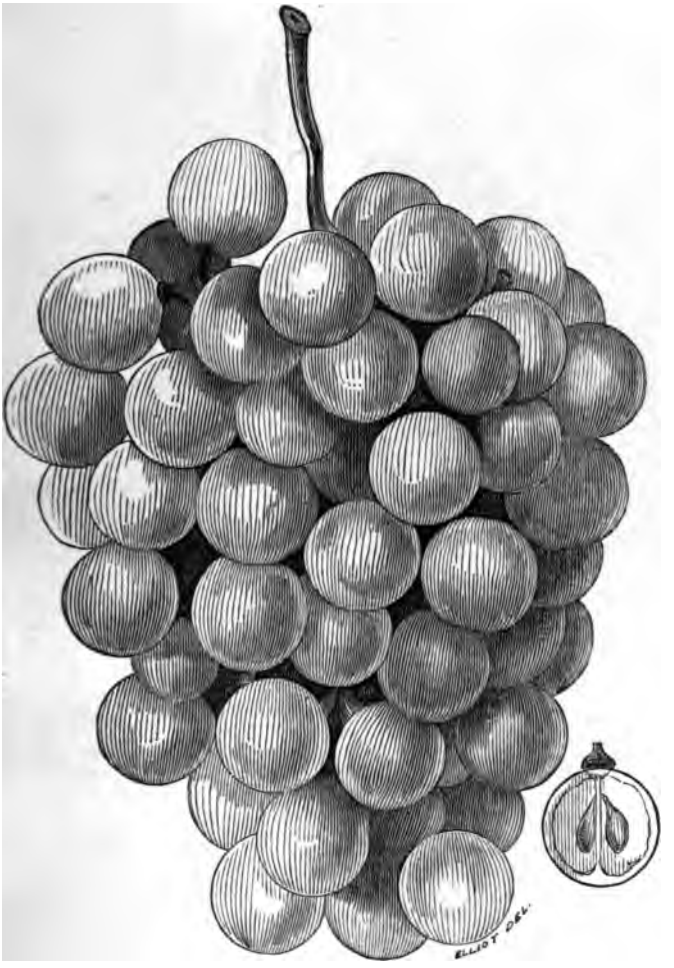
Fruit.[illegible] r small, not sho[illegible] [illegible]e, compact, nearly [illegible]und, sm[illegible] [illegible] thin blue b[illegible] [illegible] hick; flesh, harsh, [illegible]ulpy, ju[illegible] [illegible]her, althoug[illegible] [illegible]y gathered and eaten [illegible] [illegible] [illegible]



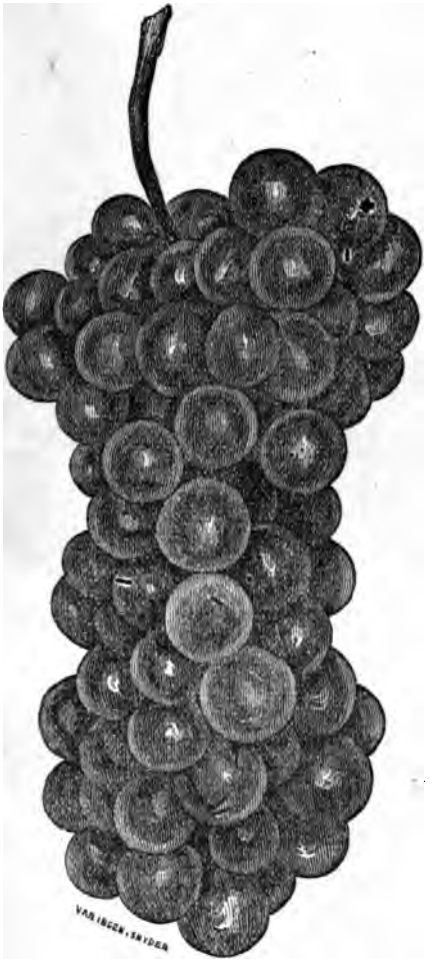
CATAWBA.



CONCORD.



CHARLOTTE.



CLINTON.

ountry where the Catawba and many other varieties can
can only be valued as a prospective parent, in part, of
ke it, to northern and unfavorable positions for grape-
ime there are many sections where this variety is deemed
nt of its hardihood of vine.

DELAWARE.

edium or small, compact; berries, small, round, clear
skin; flesh, tender, juicy, sweet, without pulp; season,

lerate healthy growers, short-jointed, close-grained wood.
iety is somewhat in dispute, some claiming it as a for-
originated in New Jersey. The growth and habit, how-
its native character. It was first brought to notice by
laware, Ohio, whence its name. As a small delicate
sally esteemed, and as a wine grape is regarded by some
It makes a wine similar to the best Rhine wines.

ISABELLA.

rge, rather loose-shouldered; berries, oval, large, dark
e nearly black and covered with a blue-black bloom:
ne pulp; juicy, sweet, rich musky aroma; season, last
October.
hardy in far northern localities, but perfectly so in all
Very liable to mildew. Probably a native of South

LYDIA.

dish, not shouldered; berries varying, sometimes oblong,
; large, generally regular; color, greenish white, shade
n fully ripened; skin, thick like Catawba; flesh, juicy,
of the native aroma; season, very early, or before the
seedling, originating on Kelley's island, Ohio, and first
y Charles Carpenter.
strong a grower as Isabella, and so far as tested proves
has all the character of a native. The fruit is large,
ell, and when fully ripe has been pronounced by ama-
grape.

MOTTLED.

lium size, slightly shouldered; berries, round, very com-
d when ripe; held to the light they exhibit two shades
led character—hence the name; dark blue bloom; short
pulled from the peduncle leaves no stain; sweet, vinous,
hick, like Catawba; season, September.
ardy, healthy, short-jointed; leaves, upper side yellow-
downy. Originated with Charles Carpenter, Kelley's
ly valuable as a wine grape, while, at the same time, it
, drying like a raisin ere it will drop.

MAXATAWNY.

edium, five or more inches long, usually not shouldered,
compact; berries, fair size, greenish white, sometimes
hen fully ripe, roundish, oval; tender, not pulpy, sweet
last of September.

Vines.—Healthy, vigorous, perfectly hardy in Pennsylvania, foliage large, deeply indented, quite free from disease.

This is a seedling, and originated in Montgomery county, Pennsylvania, and was first brought into notice in 1858.

NORTON'S VIRGINIA.

Synonym: Norton's Seedling.

Fruit.—Bunches, long, sometimes eight or nine inches, occasionally shouldered; somewhat compact; berries, small, round, dark purple, nearly black; skin, medium thickness; flesh, pulpy, brisk, rough; season, October.

Vines.—Strong, vigorous, hardy, healthy; foliage, medium size, coarse, free from all diseases. Originated with Doctor N. Norton, Richmond, Virginia. In the south and west this has proven one of the most valuable wine grapes grown. It is a great bearer, and makes a wine much resembling pure port.

REBECCA.

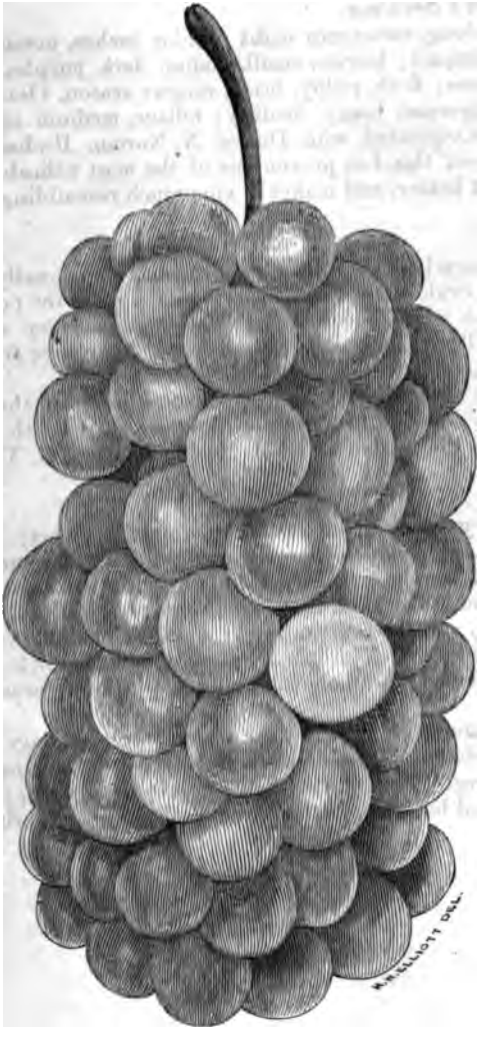
Fruit.—Bunches, nearly cylindric, very compact, occasionally shouldered; berries, medium size, oval, compressed, adhering strongly to the peduncle; color, light green or greenish white, becoming pale amber at maturity and in the sun, a light bloom partially translucent; flesh, melting, juicy, free from pulpiness; musky aroma; seeds, small; season, last of September.

Vine.—Moderately vigorous; hardy in most sections where the Isabella succeeds; leaves deeply lobed, upper surface light green, whitish down underneath. Originated in the garden of E. M. Peake, Hudson, N. Y.

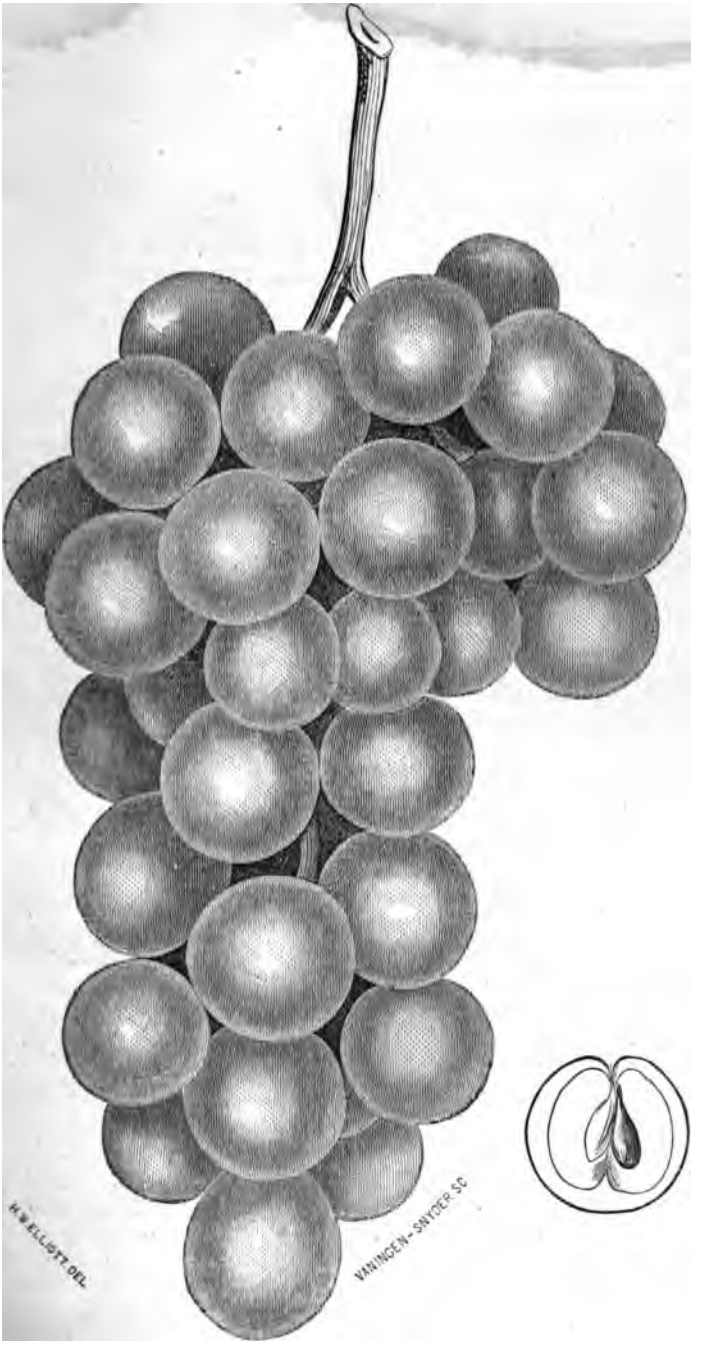
ROGERS' HYBRID, NO. 15.

Fruit.—Bunch, very large, shouldered, moderately compact; berries, large, round, slightly elongated, peduncles large, varying in length, some short, others long; color, rich dark maroon purple, with a light purplish bloom; flesh, witl an outer rim of flesh next the skin, from which the pulp with seeds separates; pulp, yellowish white, a little firm, and with a slight harshness of the native fox grape, rich, vinous, sweet, aromatic; skin about as thick as Catawba; seeds, very light brownish white, obovate, obtuse, pyriform; season, middle to last of September.

Vines.—Strong, vigorous, hardy, healthy; large, strong foliage. Originated with Mr. Rogers, of Salem, Massachusetts, hybridized from a native wildling and the black Hamburg. The berries hang well to the bunch, drying almost without shrivelling, and becoming better three weeks after gathering than when first plucked.



REBECCA.



ROGERS' HYBRID, No. 15.

CRANBERRY CULTURE.

BY S. B. PHINNEY, BARNSTABLE, MASSACHUSETTS.

THE cultivation and propagation of the cranberry ("Oxycoccus macrocarpus") is now largely increasing throughout the country to such an extent and importance as to merit a larger notice than can be given it in this article.

Although one species of this popular fruit is known in England and on the continent, yet it does not compare with that grown in Massachusetts, where the cultivation first commenced in this country, dating back in Barnstable more than fifty years. While there is everywhere such a large demand for this fruit, it seems really surprising that its cultivation should not have more nearly kept up the supply to the demand.

It grows on land almost valueless, with comparatively little cultivation or care after the bed is properly started; is readily enough harvested; brings a great price, and keeps a long time after being gathered.

There seem to be but two serious troubles in cranberry-growing in Massachusetts. One, the "worm," more fully described hereafter; and the other, early autumnal frosts; and both difficulties can be overcome by flooding at the proper time, if the location of the cranberry bed will admit of it.

I have personally examined a considerable number of cranberry bogs, and have been a cultivator of the cranberry since the spring of 1851, yet I do not rely so much upon the facts and information which my own experience has given me as upon the statement and collection of reliable data which have been furnished me by Amos Otis, of Yarmouth, Massachusetts, who likewise acknowledges himself largely indebted to Professor Agassiz, of Harvard University, for whatever of success has attended his investigation of this important subject.

Half a century has now elapsed since Captain Henry Hall, of Dennis, in the county of Barnstable, commenced the cultivation of the cranberry. His bog, or "cranberry yard," as he called it, has no year since failed of producing a remunerative crop. For the thirty years next after Mr. Hall commenced, many experiments were made by others, and most of them proved to be failures; but these failures had their use; they prevented others from falling into like errors. The general cultivation does not date back further than the year 1850, yet since that date there have been many failures, and many bogs recently set will never yield remunerative crops. By this term, and by "successful cultivation," I mean that the crops, including the present value of the bogs, have more than repaid the original cost, interest, and incidental expenses of cultivating, picking, and sending to market.

EXPERIMENTS AND FAILURES.

On the bog of Mr. Hall every fact necessary to be known might have been
ied, yet the information to be derived from his experiments was not often
ght or regarded. Almost every beginner had a theory of his own, not based
own or the experience of others, and the result was that nine out of ten
de such experiments failed of success.
ng the last fifteen years cultivators have been more discreet. Before
g much time or money they examine other bogs, collect information
mose who had had experience, and thus avoid falling into some of the
their predecessors. Though many facts in regard to the culture, and

much information has thus been obtained, yet no reliable system of cultivation has been established. The science is in its infancy, and much is yet to be learned.

SOIL.

The cranberry cannot be successfully cultivated on the "*drift formation.*" Hundreds of experiments have been tried, and all have proved to be failures. It is unnecessary to give details—they would fill a volume, and be of little practical utility. Professor Agassiz describes the "*drift formation*" as being that portion of the earth's surface which was formed by glacial action, and consisting of rocks not in place—that is, loose, and not in solid ledges—gravel, clay, and loam. This definition is plain and simple, and every farmer will understand it, and will be able to distinguish *drift* as soon as he sees it. In that formation strata of sand are often found, but it usually contains some loam, and it is better to avoid its use. Bogs naturally well adapted to the growth of the cranberry have been ruined by using *drift* material in preparing them. In some bogs where partly *drift* and partly *alluvium* was used, the exact line between the two can be traced by the difference in the growth and appearance of the vines.

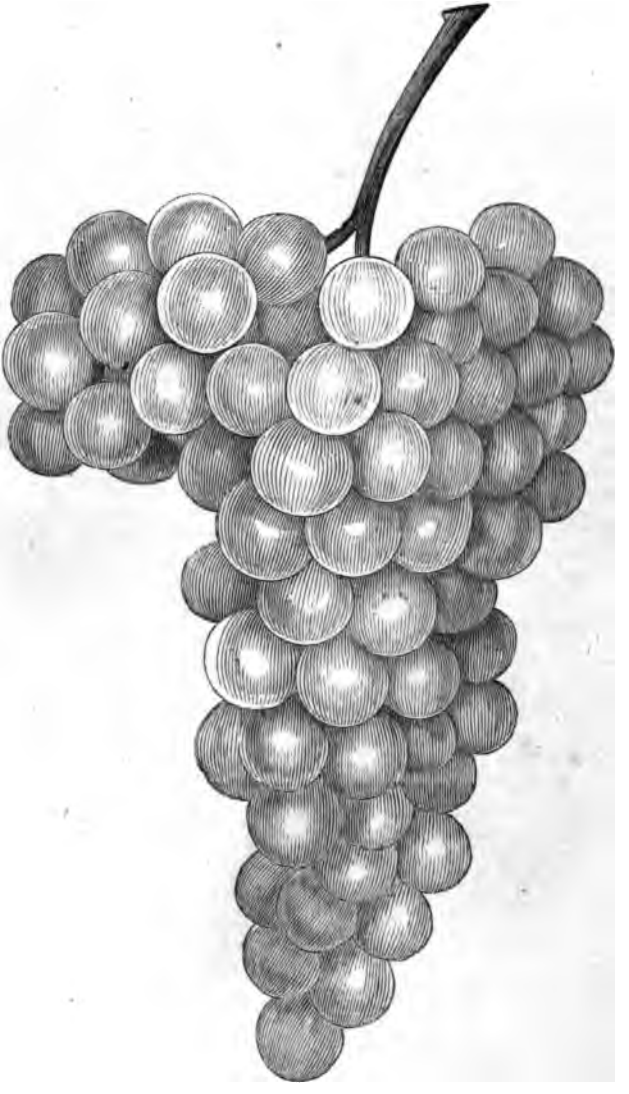
The "*alluvial formation*" is the only one on which the cranberry can be successfully cultivated. Though this formation includes the most barren and the most fertile soils—the dryest and the most damp—yet its character is well marked, and it can be easily distinguished. Sand or quartz-rock, pulverized or granulated, is alluvium, separated from the drift by the waves and currents of the ocean, and elevated by the action of the winds and waves. The deltas or rich interval lands near the outlets of rivers are *alluvium*, and are formed by the subsiding of the finer particles brought down by the current of the streams. The mud found in the narrow bogs and creeks near the sea-shore is of the same character. Salt and fresh meadows, formed partly by such deposits of mud and partly by decayed vegetable and animal matter, belong to the same class. Peat differs from marsh mud only in this, one is formed in fresh and the other in salt water. There are two, if not three, distinct varieties of peat; but all peat and all mud, whether fresh or originally salt, seems to have the same influence on the growth of the cranberry, and. practically, may be regarded as the same.

The best soil for the cranberry is beach or quartz-sand, overlaid by about a foot of turfy peat. Of this character are some of the most productive bogs in Harwich. In preparing such bogs, all that is needed is to subsoil the same, bringing about three inches of sand to the surface. Underlaying the deeper peats, the sand has become indurated, but on exposure to the air, crumbles like meal or lime, and may be a useful top dressing. If the peat is deep, and covered with rushes, wild grasses, or bushes, the whole must be pared over down to the bottom of the roots and removed, and the bog covered with beach or quartz-sand from five to fifteen inches in depth.

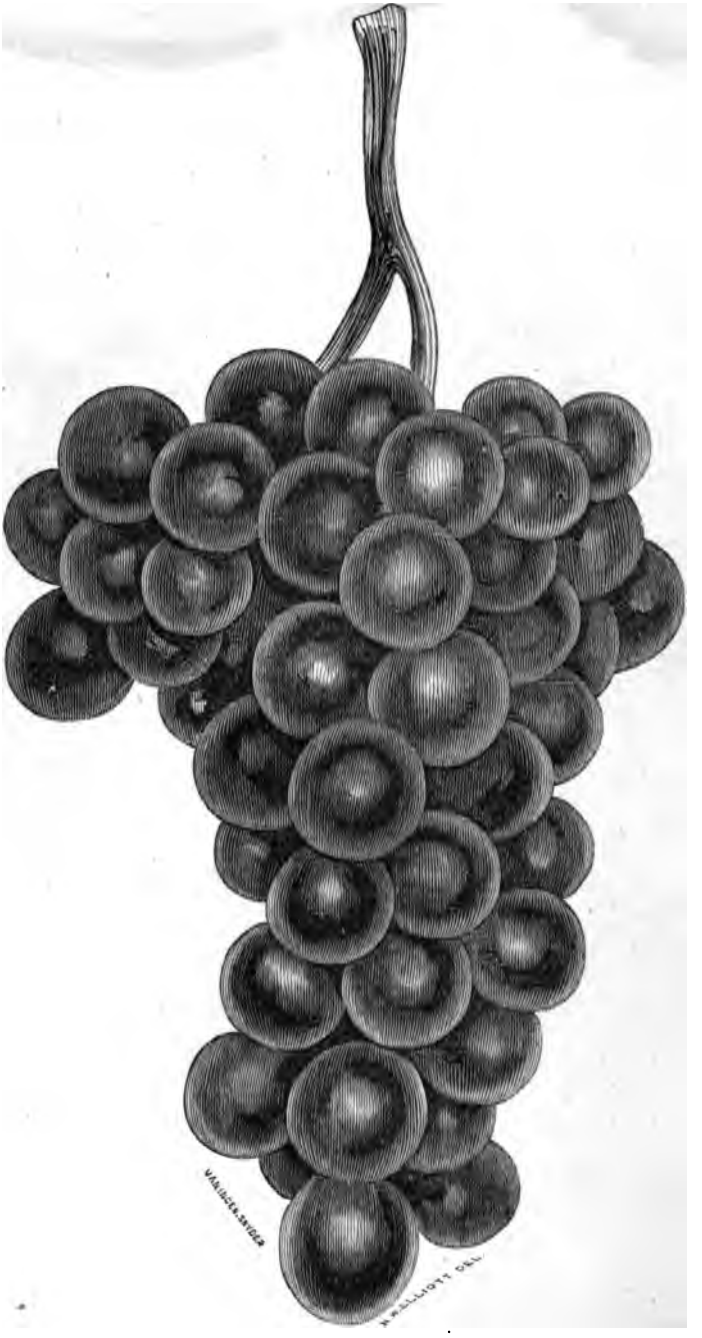
On rich *interval* lands the same precautions must be used. If a thick coating of sand is not first spread over, it will be difficult to keep out the wild grasses, and if kept out, the cranberry vines will, as on the deep peats, make too much wood and be unproductive.

Some *interval* lands are naturally adapted to the growth of the cranberry. Such are usually found near the sources of streams or on the borders of rapid rivers. They contain much sand and fine gravel, and are easily brought into cultivation. Of this character are some of the bogs in Barnstable, and I am also informed that bogs at Franklin are similar.

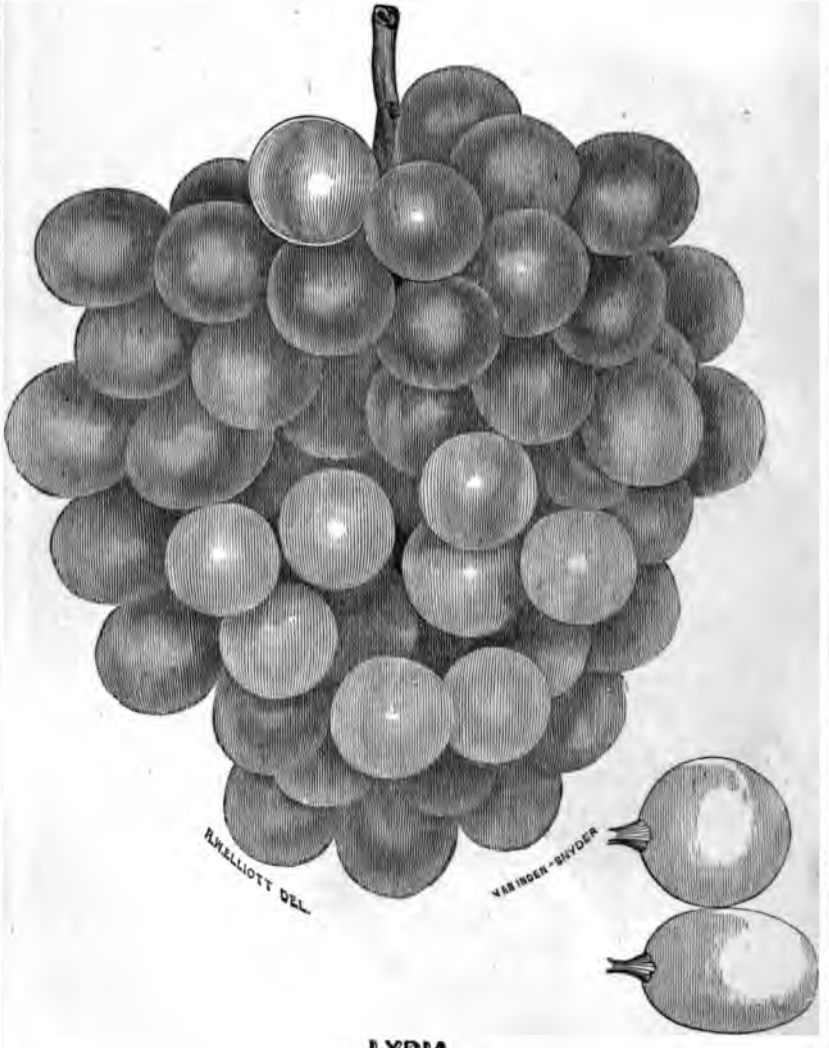
On pure deep, black peat, the cranberry vine will grow more rapidly than in any other soil. A single crop will perhaps be obtained, and then the vines become abortive. The same is true of vines grown on rich intervals, if the



DELAWARE.

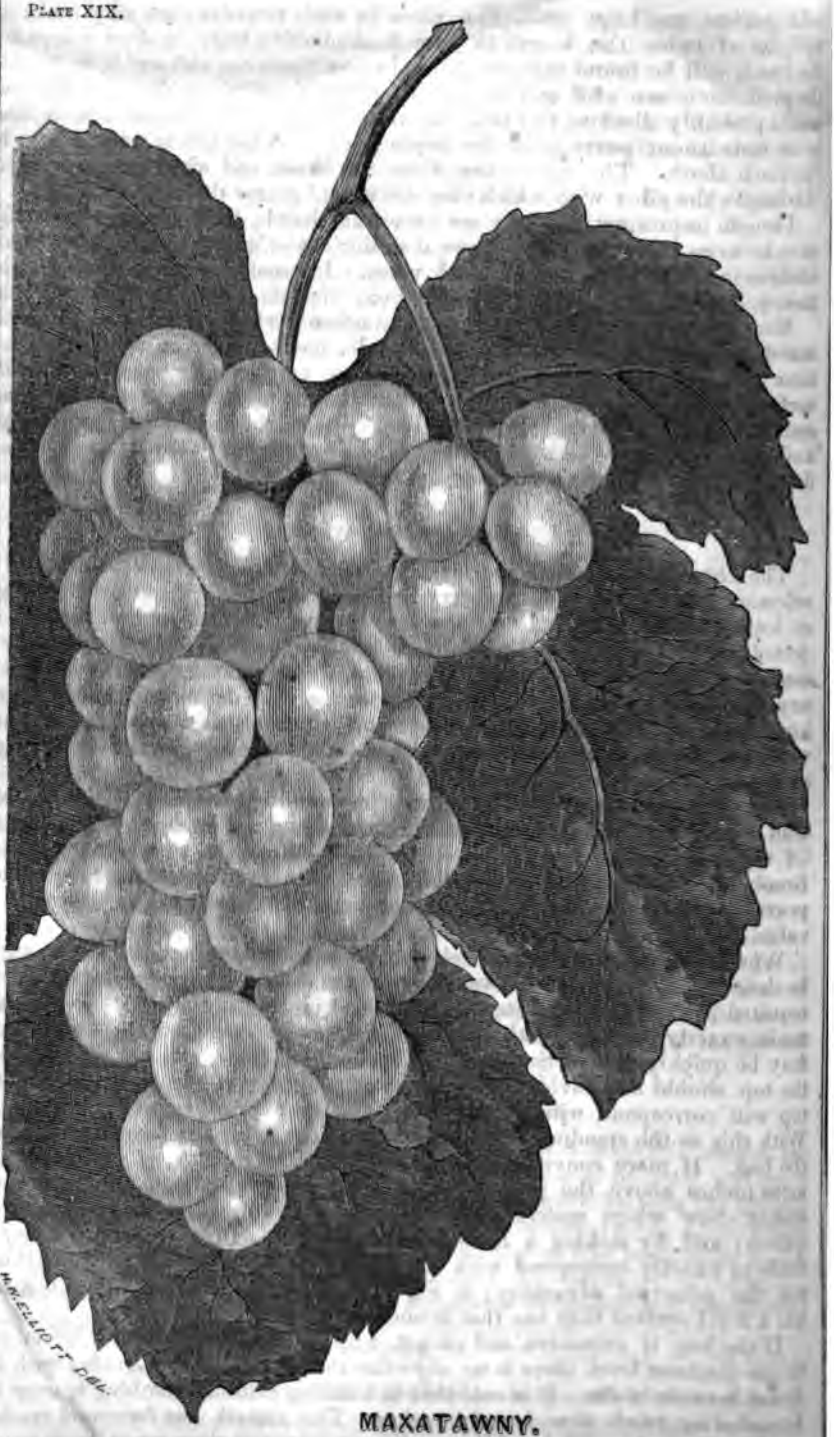


ISABELLA.



LYDIA.

PLATE XIX.



MAXATAWNY.

ild grasses are kept out. The vines in such situations are very rank, the
nights of twice the length they are in productive bogs; and on comparing
two it will be found that the unproductive vines are soft and flimsy, while
productive are stiff and hard. A careful chemical analysis of the two
n l probably disclose this fact, that the productive vine contains more silex
ts constituent parts than the unproductive. That this is so is shown by
ne touch alone. The productive vines are harsh, and when drawn between
he fingers the silex with which they are coated grates the skin.

Though unproductive vines are somewhat harsh, there is a marked differ-
ence between the two. This shows that silicious or quartz-sand is a necessary
element in the production of bearing vines. In proof of the correctness of this
theory, I might cite the results of many experiments. I will refer to only one.

Many years ago Mr. Henry Hall transferred vines from his bog near the
sea-shore, to which reference has been made, and set them on a deep peat bog
near his dwelling-house. These vines grew very rapidly, soon covered the
surface of the bog, but never bore fruit. There are some peat swamps sur-
rounded by sandy lands, into which, in process of time, the rains have washed
and the winds have blown sufficient sand to make the vines set in them pro-
ductive; but such bogs are rarely met with.

DRAINAGE AND WATER.

The first point to which the attention of the cultivator must be directed in
selecting a situation for a cranberry bog is drainage. If it cannot be drained
at least eighteen inches below the general surface, the situation must be re-
jected. Flowage is not absolutely essential to success, yet to have water at
command so that the bogs may be flowed or the water raised in the ditches at
any time, within twelve inches of the surface, is very desirable. Bogs that are
kept flowed till the 25th of May or 1st of June insects rarely trouble; and
when an abundance of water is at command, the damage often caused by early
or late frosts may be prevented.

Where the drainage is imperfect, it is impossible to keep out the rushes and
wild grasses, and the vines become choked, and are rendered unproductive.
Of this character is the bed near the county road, on the west side of White's
Brook, in Yarmouth. Some of the vines have been set more than twenty
years, and the soil is naturally good, but imperfect drainage has destroyed its
value.

When a situation has been selected for a cranberry bog, the first thing to
be done is to level it. A levelling instrument is not necessary. All that is
required is a strip or plank ten or fifteen feet in length, the edges jointed and
made exactly parallel; with this and a common carpenter's level the work
may be quickly done. Stakes of a foot or more in length, cut off square at
the top, should be provided. Begin by driving one of the stakes so that the
top will correspond with the proposed surface of the bog when completed.
With this as the standing point, run several lines of stakes through and across
the bog. If more convenient, the tops of the stakes may be elevated six or
more inches above the proposed level. This operation is important because
stakes show where material is to be removed, and where filling is to be re-
quired; and by making a little calculation the earth to be removed may be
made to exactly correspond with the amount required for filling. But this is
not the principal advantage; it requires much less water to flow a bog that
has a level surface than one that is uneven.

If the bog is extensive, and cannot, without too much expense, be reduced
to one common level, there is no objection to having different grades with low
between them. It is said that in building railroads nothing is ever lost
ding much time in engineering. This remark has force and truth in
applied to cranberry bogs. The money and time spent in laying out

the work to be done is always economically expended. All that is to be do and *how* it is to be done, should be known before work is commenced. many bogs it would be economical to employ an experienced engineer, s have marked stakes put up, profiles and working plans drawn. With st marked stakes and drawings, the workman knows when he has filled his l row, where he is to tip the contents. There will be no mistakes, no alterati to be made, and in the end money will be saved.

The depth of sand required to be spread on the surface depends upon depth of the peat. If the latter is only a foot or two in thickness, five inc of sand is considered sufficient; if it is several feet, at least a foot of san required to make a good bog. The more sand there is used, the longer it quires to bring the vines into a bearing state; but when brought into t state they continue to bear for many years.

At Sandy Neck, on the north side of Barnstable harbor, the cranberry grown in natural bogs for hundreds of years. The soil of these bogs is be sand, with a small mixture of peaty and vegetable matter. They prove t a large admixture of peat or mud is not essential to the growth of produc vines. Some experiments, however, have been made, showing that their ductiveness is increased by spreading over them peat or marsh mud. S of these bogs are covered with water in the winter and some are not; bu all of them water can be usually found in the dryest weather within abo foot of the surface. A few bogs have been formed there by dyking in salt fresh meadows and covering them with sand. These have proved to be v productive.

PREPARATION OF SOIL.

At Provincetown, where the soil is very similar to that at Sandy Neck, experiments have not been uniformly successful. A difficulty occurs ther obtaining a proper grade. In the wells of that village the water rises and f with the tide. Further inland the same cause operates to a limited ext During a course of high tides the water in the low lands, where the cranb vines are set, often rises so high as to injure the crop; and during a cours low tides, if dry weather happens at that time, the vines suffer from drou In situations not thus affected the cranberry is very productive. In swamps, where the mud is deep, the cultivators are troubled with grasses and rushes, and for that reason sandy bottoms are preferred. also found by numerous experiments that very little peat is absolutely es tial to secure a crop. The best and most productive vines are usually fo on the edges of the bogs, where the sand was removed to the depth of sev feet in grading. In such situations there is no peat or mud, but the w contains sufficient material in solution to promote the growth of the pla In such situations guano and other fertilizers have a good effect.

TIME AND MANNER OF SETTING.

The spring of the year is usually considered the most favorable season setting. The cranberry vine, however, is very tenacious of life, and will g if set at almost any season. The usual course is to punch holes in the gr about eighteen inches apart each way, and insert therein two or three v and afterwards press the soil around them. Dr. Shove, who has had large perience, sets the vines in shallow furrows made with a common iron cultiv He lays the vines down in the furrows and covers them, leaving out the of the vines.

INSECTS.

The habits of the insects that are injurious to the growth of the cranb have not been carefully studied, and sufficient information has not been colle to enable me to speak with confidence on the subject. There are two v

m as the vine-worm and the berry-worm, injurious to the cranberry. The
s a variety of the caterpillar, about half an inch in length, with a black
The other, when fully grown, is of nearly the same size, and has a red
The vine-worm destroys the leaves and blossoms, and, consequently,
ne crop. The bogs in which they commit their depredations appear as if they
had been burnt over. The berry-worm is usually found in greater numbers in
the dryest part of the bog. Like the curculio, it destroys the fruit it enters.

The cultivators who have had the most experience say that if the bog is kept covered with water till the 25th of May or 1st of June these pests rarely commit any depredations.

One-half the bogs in this county are so situated that they cannot be kept flooded till June 1. Dr. Shove, of Yarmouth, Rev. Mr. Myrick, and other gentlemen in Provincetown, have, perhaps, studied the habits of these insects more carefully than any, and have experimented with decoctions of tobacco and other articles. They have been partially successful. Professor Agassiz suggests that the following experiment for destroying the fruit-worm be tried: First, to ascertain at what season of the year it appeared in its miller state, and, having ascertained that, to build, at night of that season of the year, small fires in the vicinity of the bogs; the millers will fly into the fire and be destroyed. If every one who has a cranberry bog will watch the habits of these insects, and report his observations, much valuable information will be obtained. This should not be carelessly done. The date of every observation should be carefully noted. If building fires is the remedy, it is all important to know the exact date at which the insect appears as a miller, and how long it continues in that state. The probability is that it does not exist as a miller more than a week or ten days, and if the exact time is known, it is easy to apply the remedy. These insects are said to be unlike any described in the books. Dr. Shove says the miller of the fruit-worm appears about the time the berry begins to form. If subsequent observations confirm this, it is advisable to test the remedy suggested by Professor Agassiz. Dr. Shove further states that the miller punctures the cranberry and lays its eggs under the skin, in the same manner that the curculio punctures the plum or the cherry.

The reason that flowing till the first of June is not a perfect remedy against insects is, perhaps, this: In the fall, when the insect changes from a worm and becomes a chrysalis, it buries itself in the ground. All do not bury themselves on the bog, but on the borders. These are not affected by the flowage; but, as the vines are kept back by the water, further investigation may show that these are the only ones that flowage prevents from committing depredation. It has not certainly been ascertained that the chrysalis of these insects is destroyed by water, but the facts stated indicate that it is so.

PICKING AND PACKING.

Of late years many have been too careless in picking and packing their cranberries. This is a great mistake. They should be picked by hand, and
d not more than five inches deep in hurdles made of laths left open, so
air can draw through them. These hurdles should be piled for three
m a room where the air circulates freely. If kept in this manner for a
r time, it would do no harm; the berries would become perfectly ripe,
l eafter be less liable to rot or to be injured by frost. When taken from
use l ales they should be winnowed, and every unsound berry picked out by
. It is also important that the barrels or packages in which they are put
l be dry and clean.

PROFITS.

the cultivation of the cranberry is a profitable branch of industry is
l fact. Thus far, perhaps, much more has been expended than

has been realized. Many have lost all they have spent for want of information and want of experience, and a few who were successful have realized large profits. Mrs. Winslow, of Brewster, in this county, realized a thousand dollars from a single acre. I might name many others who have realized nearly as large profits. At the present time the man who carefully collects the information which has been gradually acquired during fifty years of experiments may as safely rely on a profit from his investment as any farmer can from any other cultivated crop, and the facts will show it. Can a single instance of failure be pointed out where the mode of culture described has been carefully followed? I know of no single instance, and I have examined many bogs for the purpose of ascertaining the correctness of the theory and practice now recommended. I have endeavored to sift out from voluminous statements the facts that are of value, and I will now recapitulate them in a form easily retained in the memory

1. The cranberry cannot be successfully cultivated on the *drift formation*—that is, on a soil composed of clay or loam.

2. There must be the means of draining the bog eighteen inches below the general surface.

3. All bushes, wild grasses, and roots must be pared off and removed.

4. If the soil does not naturally consist of sand and an admixture of peaty matter, it must be artificially corrected; if peat, by putting on beach-sand, or sand composed of fine particles of quartz rock; and if pure sand, by adding peaty matter.

5. It is desirable but not essential to have the command of water, so that the water in the ditches can be raised within twelve inches of the surface at any time, and also in sufficient quantity to flood the bog in the winter or spring.

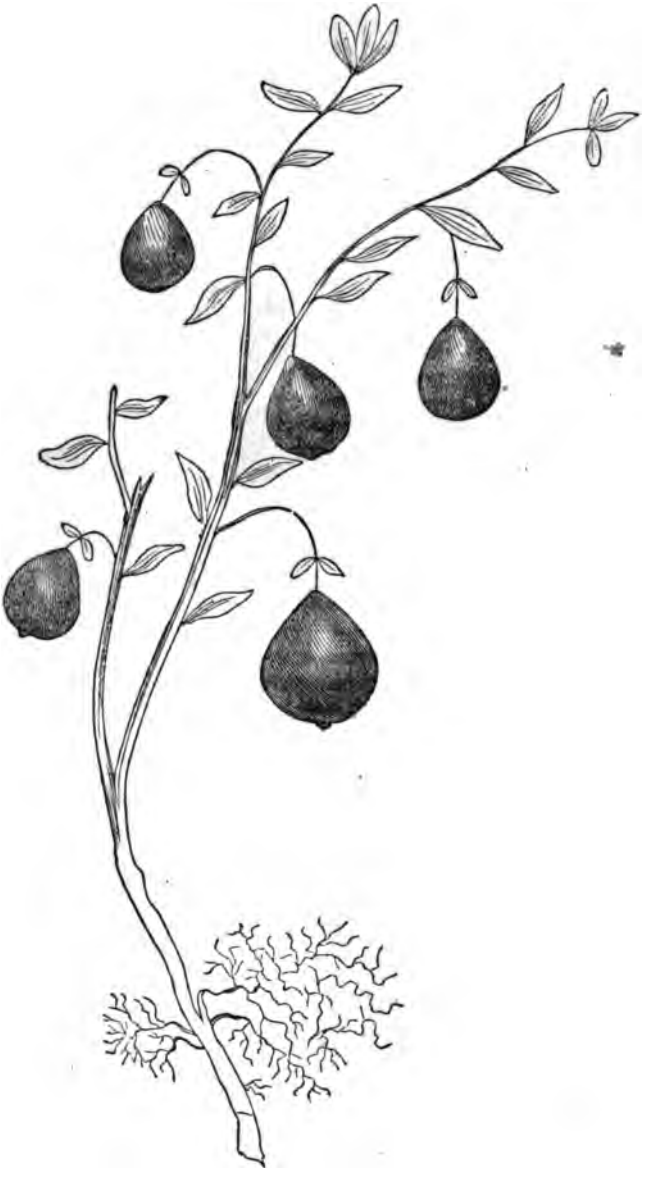
STATISTICS OF THE CRANBERRY CROP IN BARNSTABLE COUNTY.

The following table shows the amount of cranberries raised in Barnstable county, Massachusetts, during the season of 1863, and the prices for which they sold per barrel:

Towns.	No. of bbls.	Price.	Amount.
Harwich	2,697	$9 50 to $11 00	$26,934 50
Brewster	611	9 00 and 10 00	6,031 00
Dennis	423	9 00 and 10 00	4,054 75
North Dennis	402	9 00 and 10 00	4,000 [illegible]
Chatham	168	9 00 and 10 00	1,640 00
Barnstable	425	10 00	4,250 00
Yarmouth	200	10 00	2,000 [illegible]
Sandwich	175	10 00	1,750 00
Provincetown	125	9 50	1,187 5[illegible]
	5,176		51,847 7[illegible]

Barnstable county was the earliest in the culture of the cranberry, [illegible] fr[illegible] the best information to be obtained it is estimated that it now produ[illegible] one-half of all that are cultivated in the State. This would give s[illegible] w[illegible] over 10,000 barrels for the year 1863. There is a great increase in the consumption of the cranberry, and this fact should encourage those who [illegible] lands of the kind pointed out to make an effort to cultivate the vine.

BELL CRANBERRY.



CHERRY CRANBERRY.

Rev. Mr. Eastwood, in his manual for the cultivation of the cranberry, says has seen a pint of cranberries, marked "Cape Cod Bell Cranberries," sold four shillings sterling in the "Strand," London.

Boston is the great market for cranberries, being nearest to those regions in ich the vine is cultivated. The New York and Philadelphia markets within few years have become extensive purchasers, and Boston dealers ship (tities to these ports. Of such profit is the cranberry that growers a by city dealers a month or two before the berry has been ready to and they frequently purchase them thus early at prices varying from $9 $10 per barrel.

The accompanying engravings show berries of their natural size, and are of "Bell" and "Cherry" species. The "Bell Cranberry" is so called because some fancied resemblance to a bell in its shape. Of this species there is but variety. It is of good size, and almost as dark colored as blood coral when ll grown and fully ripe. It grows in some sections to great perfection.

The "Cherry Cranberry," so called from its similarity in shape, size, and or to that well-known fruit, is of two varieties, large and small. It is hard; color is very dark or a blackish crimson, when properly cultivated. Occa- lly these species are known to bear seven berries on a single branch of the r, but five, as here represented, are the more common product.

There are several other species and sub-varieties of the cranberry, both wild l cultivated, but they are not so generally known in this section of New nd as those described, nor are they so valuable for market or domestic use.

CULTURE OF THE STRAWBERRY.

BY GEORGE H. HITE, MORRISANIA, NEW YORK.

In writing upon the culture of the strawberry, we will speak—first, of the paration of soils; second, of garden and field culture; thirdly, of propaga- hybridization, forcing, &c.

I. PREPARATION OF SOILS.

The ground should always be healthy, and of a friable nature, made deep permeable; clay loam should be trenched at least twenty inches, and the oil brought to the top. Well-rotted manure should be equally introduced ithin six or eight inches of the top, or, if the trenching is done in the fall, stable manure may with safety be used, provided the planting is done in spring. In the above kind of land, manure can be used with impunity, ided it is kept six or eight inches below the surface, *i. e.*, where the roots newly set plants will not reach until they have gained some considerable e of strength, which, by that time, will find the manure sufficiently decom- to receive them.

y loam should be deeply dug, and well-rotted manure interspersed r roughout. All land that is not underdrained requires to be deeply tr hed, and a proper equilibrium of the soil obtained by being well ces. Still rains that fall will pass immediately downward, which] nence of moisture that may be relied on in the season of

Another method of manuring the above kind of land for field culture is t spread the manure equally over the whole surface; then, with a mould-boar plough, turn the manure under in the manner sod lands are ploughed, an harrow it evenly, without bringing the manure too much to the surface,

It is by no means necessary or proper that stimulating manures should in close proximity to the plants. If they are below the surface, as abov stated, in clay lands, the effects are soon felt in the opening of spring, whe the warmth of the sun acts upon the surface. All that is required at the tim of planting is to use ashes, or, if ashes cannot be had, a compost of old head lands*—soil from around decayed stumps, logs, or leaf mould, or any decom posed vegetable matter, finely screened, and sowed along in the furrow, t induce the first growth of the young plants. The top dressings which they receive in after growth will be quite equal to the necessity of the majority of plants.

II. GARDEN AND FIELD CULTURE.

Of garden culture I may be allowed to repeat, in part, what I have said i my article on strawberry culture, published in the Transactions of the Ame ica Institute of 1860, page 148, inasmuch that, after various subsequent experi ments, I find nothing to alter, but considerable to add in detail.

After the preparation of the ground, as above stated, when it is raked c harrowed level, make, by line, two rows fourteen inches apart. Then, wit the corner of the hoe, make miniature furrows about six inches deep, quit regular, from one end of the bed to the other. Then take two and a half fe between that and the next two rows for an alley, and so on over the spa allotted for the bed. Procure some unleached wood ashes, (leached ashes a nearly as good,) or a plenty of coal ashes may be used as a last resort. (Th last should not be suffered to get wet before using.) Sprinkle them all alo in the bottom of the furrows, say to the depth of one inch. Then, with t end of the hoe handle, mix the ashes well with the soil without changing t form of the furrow. Next make holes fourteen inches apart with a gard trowel (not a dibble) along in the rows where the plants are to go. Set t plants carefully in these holes with the roots spread horizontally, so that th crowns will be two inches below the general level of the prepared ground, f the reason that when the plant has gained size and strength, it will admit being hoed without drawing the earth from between the rows. This lit bank or ridge of ground, in sandy soils, should at the time of planting removed from between the rows to be drawn upon as necessity requires, as t rains are apt to wash it into the furrows too soon, and smother the plant; a in rolling lands it is also necessary to use the same precaution, as the soil l by the side of the furrow when made will, as it is from time to time drawn in the furrow during the first and second season's hoeing, enable the plant to p forth new roots above the old ones. (These newly-formed roots from the s shoots rise above those of the old plants, and become the absorbents; the m ters passing through them to sustain the new side shoots do not sustain the o plant to which they are so nearly connected.) By fall the furrows will be l this gradual process nearly filled up, so that the bed will present one lev surface. Meanwhile bear in mind to pinch off the runners as they appe These runners frequently make their appearance simultaneously with a sm incipient leaf, and, if not suppressed in time, will draw so much upon the ro that the plant will not produce a crown, and will eventually waste the whc substance of the plant. As the plants are not expected to bear much fruit t first season, it is well to go over the ground after rains with a rake about o

* By *headlands* we mean the accumulation of leaf mould, &c., round old fences of p lands.

foot wide, with six-inch prongs, to destroy any weeds that may begin to ap-
An instrument to be found at the hardware stores, known as the
drag," is the most suitable implement for this purpose that can be
. It is like a five-tined fork, bent down in the form of a rake, and
s the double purpose of fork and rake. I use it from the first, if the
is friable.

The plants are now established, and ready to be covered over late in the fall with hay, straw, leaves, or anything of the kind which contains no seed. Over this, pea brush should be laid, to keep it from blowing off. This process of covering answers many good purposes, among which are, it keeps the fruit clean, holds the weeds in check, retains moisture longer in the ground, and last, though not least, without it, in spring, the frost coming out of the ground is apt to crack the earth around the plants, and snap the spongioles or roots, which are of essential importance to the early bearing of the plants. It is necessary to part the straw from over the plants, and crowd it around the collars of the same when the season fairly sets in, and there let it remain until they are done fruiting. This is a practice of covering, the perfection of which would be to crowd the straw around the collar of the plants, once for all, early in the fall, and a little later, before winter sets in, with a wisp of the same cover the crown and top entire. By this mode we avoid the possibility of the straw becoming matted by rains and snows, which often smothers the plants and retards their early vegetation. Of course this supersedes the necessity of parting and adjusting the straw in the spring, as by the process first mentioned. Bear in mind not to touch them with rake or hoe until they have done bearing. If weeds appear, pull them up while young.

When the plants are through bearing, the straw should be removed from the ground, and the process of raking, spading, or forking begun. Here the potato drag, or five-tined rake, plays a good part in forking in the alleys and between the rows. All we have to do is to strike the spot, and, with the handle as a lever, we raise the earth with the greatest ease, and with a lateral action of the same break and, at the same time, leave it level at one blow. I must here remark the propriety of leaving the surface of the ground somewhat rough, for the reason that the rains are apt to pack the surface too soon. This practice is most important in heavy soils. The necessity of adding earth to the plants as they require it for the side shoots, should not be forgotten, as, of course, the roots are nearer the surface of the ground. Hence the utility of planting as low in the ground, the first year, as possible, so that the addition of dirt may be made without rendering the bed an unsightly mass of hills and valleys. But, before adding this soil, sprinkle a handful of ashes around the collar of each plant. A proportion of three parts wood ashes to one part soot answers a good purpose in keeping off ants, grubs, and wire-worms; it is also of great service to the side shoots in giving them a vigorous start for the next season's bearing.

Field culture must necessarily vary from garden culture in some particulars. After the ground is prepared and made level, we would make three rows, on principle stated for garden culture, fourteen inches apart, and set the plants ve inches distant in the rows, leaving twenty inches between that and rows more. Here we must, in planting, be governed by circumstances, of our best varieties vary in their habit. For example, if we plant s Seedling, it succeeds best planted sixteen inches apart. Triomphe de does not spread quite so much; therefore we plant them fourteen inches Hooker's Seedling, Prince Imperial, Brighton Pine, and others of the ed "shy bearers," should be planted six inches apart in the rows. Thus, ful attention to the arrangements of varieties, we secure profitable leave a space of about four feet for a road, that will admit a truck on two wheels, that will hold a good-sized barrel, arranged some-

what like the street sprinklers drawn by a horse, with a rose similar to a watering pot at each end of a cylinder or hollow tube of proportionable size, which in passing between the above six rows will, by this means, furnish a *bountiful* supply of water; and the twenty-inch alley will afford ample space for cultivation, gathering fruit, &c. Then from the "road" take three more rows again; then twenty inches for another alley, and so on through the allotted plantation.

In field culture we wish to retain the plants in full vigor for as long a as possible. The principle as laid down in keeping the bank of dirt at the period of planting, must here operate largely. We will suppose that at the first year of planting this little bank of earth is only half used, or, if it is thrown in, as a winter protection to the plants. In the spring it is partly taken out again and placed between the rows equally, for convenience sake, as the hoeings of the first season have sufficiently established the plants to send out their full amount of side shoots the coming season, and to bear their fruit. Of course these side shoots have formed their roots above those of the mother plant. Then in the fall, say at the end of the "dog days," the surplus dirt between the rows is thrown in. At this time the field presents a regular level surface. By this process we are establishing the "aggregation" of plants in each hill, and at the end of the third year an increased number of side shoots have formed with their roots above those of the second year. Of course we would want more earth to fill around the plants.

Now the flat culture system is to play the useful part. As the good cultivator of corn would say, "hoe to and from." Now the time to practice the above is important.

If the field has received proper attention, as above stated, in the fall, and mulched accordingly, there is nothing to be done until the plants have fruited and the mulch (hay or straw) is removed. Then we proceed, with the rake, to keep the ground in good order during the months of July and August. The roots grow more vigorously then than at any other time. This being the fact the young offshoots make vigorous progress. It is important that the earth should be hoed from the plant, that these roots may make great efforts to find their way down, otherwise they will remain stationary near the surface, and will consequently require additional earth to cover them, or they will suffer from the winter freezing. Late in the fall, and before winter sets in, we return the soil, which we held in reserve, by the operation of hoeing from the plant. This makes the fourth year, with its mulch. We are still on a level plain with our plants for the fifth year. The same process of operations is continued, as before practicing the same hoeing to and from the plants. This year we find ourselves in want of soil for their winter protection. We must, of course, resort to the earth that has been lying idle in the four-foot road. We can easily obtain therefrom sufficient soil and earth, or shovel it around the plants, the road being as useful for all intended purposes as before. Thus we are secure for the sixth year, all on a level plain with our plants only, as before. Now we have one more year, the seventh, to prepare for, which will require the earth from between the rows for protection. This is as much as we can expect the plantation to perform profitably.

We now seek a new plot of ground for a renewal. Our efforts to renew the same plantation would prove fruitless, for, if the ground has not become exhausted, it contains a deposit of excrementitious matter that precludes the possibility of success, to say nothing of the hordes of wire-worms and grubs that infest and destroy plants. But to plant corn or potatoes for a year or two would render it suitable for a renewal.

III. PROPAGATING, HYBRIDIZING, FORCING, ETC.

In propagating from seed it is idle to calculate upon favorable results from indifferent seeds. Fom my first experiments in this way, which were in

858, I obtained a large number of plants; and if a premium had been for the largest collection of poor berries, I should certainly have obtained sequent trials with seeds taken indiscriminately proved equally worth- being determined to succeed, I adopted a method of my own. The re- that twenty-five per cent. of the plants produced varieties equal, if not or, to any I have ever seen, both in size and quality. I did not intend e known my experiments until after another year's trial, but the plants e proved so well under the severest tests, both in their habits and hardiness, I feel confidence in expressing my belief that those who desire to raise ts from seed can with ease produce something that will reward their efforts. The ground should be prepared as above described. Obtain plants (young from the best varieties, and, if possible, of different species. In every in- e possible, plant pistillate with staminate, in pairs, twenty inches distant, their roots interlaced with one another. Cultivate them in the usual way irst season, not allowing them to bear fruit or runners. In the second sea- hey will send forth their foot-stalks with an abundance of fruit blossoms, when it is ascertained that the blossoms indicate a perfect set, with a pair scissors clip off about one-third of their number—*i. e.*, those that indicate kn Leave an equal number on both plants—early varieties will show irst*—and when in this state proceed, with the feather part of a e-quill, to agitate the plants by striking moderately one against the other. s operation should be repeated morning and evening, and at mid-day, dur- dry or rainy weather, until they have formed their fruit. To be doubly and certain of a cross, it is well to have a wire cover, similar to those used covering dishes, only that the netting (or meshes) are more open—enough so to keep off the bees while the plants are in blossom—and when the berries are formed remove them entirely.

The fruit should be suffered to remain on the vines until fully ripe, when it must be gathered and immediately mixed with enough common dry sand to cause the whole mass to appear like a paste. Then place it on earthen dishes, inside a well-aired house, where it is to remain some days, to undergo a sort of fermentation in the pulp, and become cured, as it is termed. I imagine they require a certain time of rest, which is indicated by the whole mass being sufficiently dry to crumble to pieces in the hands. At this time the seed should be sown with the sand, in drills or broadcast, in a situation partly shaded, (not by trees,) and with a sifter cover the whole surface of the bed from an eighth to a quarter of an inch deep. The season, at the time of planting, is generally dry, and the dews of night will not afford moisture enough for the whole day. This, with the action of the sun, will soon dry the surface and retard early vegetation; therefore it is absolutely necessary to sprinkle the bed with a watering-pot every evening after sunset.

If the bed is made in an open exposure in the ground, it will be necessary to raise a board edgewise, six or eight inches high, at each end of the bed, and lay over it some laths, or long strips, two inches broad and about three inches apart. Thus we admit light and air during the whole day. The shade from these coverings changes, as the sun rises, till sunset. At night they may be removed to one side, to admit the full effect of the dews, or be left off in cloudy and rainy weather. The seeds will continue to germinate until cold weather, and frequently the first plants will rise, with their roots almost out of the ground. These must be pressed carefully down with the fingers, and a little soil added to them. The earth-worms are apt to infest the seed-bed, and throw the plants out of the ground. To get rid of them, holes about one foot deep

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* to Mr. Peabody's theory we secure a point, at least. He seems convinced ——inate blossom sheds its pollen on the ends of the unopened pistillate, which te impregnation.—See appendix, R. G. Pardee's Strawberry Manual, page 96.

and two inches in diameter must be made, at intervals of two feet, through the bed, and kept open for the purpose of introducing a blunt stick, say t end of a broom-handle, which can be inserted to thump on the bottom, object is to produce a rumbling noise, like a mole burrowing. Their to shun moles drives them immediately to the surface, where they can be de stroyed.

On the approach of winter the whole bed should have a slight covering of hay or straw, about one inch thick, and secured in place with pea-bush. In spring, when fair weather sets in, they should be carefully set out in rows eighteen inches apart, and will, with care, become vigorous plants, and a jority of them will yield fruit the next season; and when the first and perfect berries ripen, gather and prepare them with sand, and plant the above. The great probability is that the result will be productive of large ries, which will be as good as common berries, if not better, with a per cent. o something extraordinary. History teaches us that most of our best varie have originated by hybridization of different species, also by crossing of di ferent varieties, and, probably, with the means we have at hand, we can obtai varieties characteristic of their ancestors, with a shade of improvement. A our most approved fruits have originated from a continuous planting of im proved seeds. Why not the strawberry?

Propagation by runners is by no means important. Many grave errors ar committed from ignorance of the character of the plants. The strawberry, lik the cabbage-plant, requires to be transplanted. From observation, it will b seen that the set from a runner has formed its roots mostly on one side, and if not transplanted, will send out its foot-stalks on one side also, and will no produce side shoots or crowns with regularity, as a renewal of the plant By transplanting, some of the roots are a little shortened, which is a guarante of a well-balanced plant, and an aggregation of plants will more certainly tak place to its profit. Any plant that has never borne fruit may be transplante profitably. But older plants should not be transplanted as a renewal of bea ing, unless we wish to perpetuate a special kind, and obtain runners therefrom

Obtainment of runners or sets is not less important. When a runner ad vances a certain distance it takes root, and as it elongates, forms its successio of sets to a considerable distance from the parent plant. At the same time joint is formed, about midway between each elongation, where a secondar branch will start and produce sets. These sets produce lateral branches, eac forming other sets, which will grow rather vigorously to the detriment of th original. If these laterals, as well as the sets of the secondary branches, ar used in the formation of new beds, they will always be behind, let the cultiva tion be ever so perfect. The difference is perceptible both in the bearing an the quantity of fruit, and if we propagate offsets from these plants we sha soon have a degenerate bed of the same variety—a fact which I fear has to often prevailed among honest venders of strawberry plants for want of knowl edge, until most of our best old varieties are cried down as having "run out. How often has Mr. Longworth been written to to obtain from him personall the genuine "Longworth's prolific," when the applicants already have th genuine variety, though degenerated. "Hovey's seedling," early in its h tory, produced the finest berries we have ever had. Why has it run out The cause is doubtless the same. I had a bed of "Longworth's prolific. Some of the plants produced berries weighing thirty-two to the pound. Th renewal bed which I establishd afterwards confounded me, for there were no ten per cent. of the plants that came up to the original bed. The fruits o these were small, sour berries. I did not impeach the "honesty of the nursery men," but determined to investigate the cause. I succeeded to the truth of the above practice. It is already perceptible in "Triomphe de Gand." "Wilson's Seedling" is partly an exception; it is the only plant that readily

reproduces itself from its seed or offsets. Some years since I obtained from Dr. C. W. Grant the genuine Bartlett. Some of the individual plants bore the fruit I have ever seen of that variety. The others show signs of degen- . I propagated offsets from the perfect plants, and obtained uniform s, while those that were taken indiscriminately proved irregular, although cultivation was the same throughout. So of other varieties under this of practice, which establishes the facts incontrovertibly.

re us in purchasing strawberry plants are not able to detect the difference at the time, but when the plants are in bearing it is perceived that some of the individual plants are heavily laden with large berries, equally proportioned to the capacity of the plants. Others have two or three quite fine berries; the others small, thinly set, and scattering. This difference is certainly attributable to the above cause.

It is the best practice to establish a bed of plants, for the purpose of runners, in some out-of-the-way place on the lot, and so direct the running vine that it can be readily seen as it progresses. Never allow a secondary vine to take place from the point of prolongation between the sets; and the result will be that each set, let it be first, second, fifth, or twentieth, formed on the original prolongation, will produce equally one with another.

After the first set has taken root and formed, the second set of the prolongation, with its roots, the tendril of the first, may be separated from close up to the parent, and the end inserted in the earth some six or eight inches, and the ground packed hard around it to prevent exudation of the sap. And so on with the others as they advance, thereby affording an opportunity to transplant them as often as they mature. The space left between each plant admits of its being taken up with its ball of earth attached. Thus each individual plant goes on increasing, (not forgetting to allow the mother plant to issue new separate prolongations as they appear the while,) and by fall will have grown vigorously, and will yield abundance of fruit as ample reward for the additional labor, which no lover of strawberry culture should consider a hardship.

If we wish to transplant sets obtained from a distance during the summer, we at the time of planting cover them with a board about nine inches in width, by placing blocks about six inches high at intervals along the row to sustain it in place, at the same time keeping the plants well watered. At night set the boards to one side, that the plants may benefit by the dews of night, to be replaced at sunrise, or left off in cloudy weather until they take root and recover.

The whole bed of plants in the following year of bearing will present a display of well-balanced plants, bearing fruit to the utmost capacity.

It is not the best practice to allow plants of a well-established bed to make sets for a renewal. It hinders the cultivation just at the time when it is most important. to say nothing of the unsightliness and injury to the plants.

Forcing, not unlike hybridization, if followed up to the strict directions of authors, would be attended with considerable expense, not suited to the enience of a great many, to say nothing of the time required to apply

My object in this treatise is to convey to the million the most economi- as well as the easiest way of accomplishing this desirable object, and at the time not to depart from the principles by which the whole thing is gov- d.

then, if we wish to have strawberries from two weeks to a month the outdoor plantation, having the plants arranged as stated in garden the rows running east and west, early in January or February we south side of the rows, on the edge of the alley, a board, six inches dgewise. On the north side we raise another board, about twelve , also corresponding boards at each end. all secured in position by

small stakes to keep them permanent. We then take a section of the common sized hot-bed sash and lay it over the plants lengthwise. At the same time bank some fresh manure up against the boards outside to keep the plants warm, and avoid exposure to the cold air, using matting to cover the sashes when required in bad weather, as is practiced on hot-beds. As the season becomes advanced in April, attention is required in giving air to the plants by raising the sash a little through the day and closing it again at night, not forgetting to water the plants, and covering with the mats when required as protection in cold nights. This mode of practice does not affect the plant unfavorably for subsequent bearing. They have only fruited a little earlier.

If we wish to force plants earlier we must at the proper time—*i. e.*, when the sets are forming on the runners—procure small flower-pots, fill them with good mould similar to that around the plants, and sink them just under where the set is about to take root, so as to be level with the ground, Lay a bit of clod over the vine to keep it in place until it takes root in the pot, and when the next set has rooted, separate the first one, and so on, progressively, as stated under the head of propagation. When the plants have become well established in the little pots, they are, with the ball of dirt attached, changed into a size larger, adding mould, at the same time, to fill up the pot. The pots should now be placed in a position partly shaded from the sun, and kept well watered. As soon as the roots are about to reach the side of the pot, the plant must be changed into a larger pot. This last should have a drain in the bottom, made of broken shells or small pebbles, to the depth of half an inch; and when the plant is introduced the pot should be filled up with compost made of two parts garden mould, one part leaf mould, and one part sand and pulverized charcoal mixed. By the time the plant has gained size and strength this pot, it can be taken in the house and placed on a platform, in a position where it can receive the most light and air, not omitting to give the pots a plentiful supply of water when required.

Another way by which a number of plants can be forwarded in one pot, is as follows: Take a twelve-inch earthen flower-pot, and, after depositing a drain in the bottom, as above mentioned, fill it with a compost, as before described. Then get a smaller flower-pot, say three inches in diameter, stop the hole in the bottom with a cork, and take out as much of the mould from the centre of the large pot as will admit the small one, even with the top of the dirt, in the larger pot. Thus we have a margin of dirt between the two pots nearly four inches in width. When the young sets have formed roots in the summer, they are taken up by a garden trowel, with the earth attached and planted around, at equal distances, in this margin of soil, there to remain in some half-shaded place until fall. Meanwhile the watering must be applied through the small pot in the centre. By keeping it full the fluid percolates through the sides and bottom in sufficient proportions to keep the plants in a regular, healthy condition; and when taken in the house, it should be placed on a platform where it will receive air and light. When in full bearing it presents a beautiful appearance.

This principle of forcing plants is suggestive of many variations. For example, we may have a box, tastefully made and painted, any size to suit the desired number of plants, planting and watering the same, as previously described.

If it is desired to have plants in single pots, the principle of watering may be reversed by filling a little larger pot than the one containing the plant with sand, first stopping the hole in the bottom with a cork. Take from the centre enough to let the pot with the plant down nearly even with the top. The plant receives the water through the sand between the pots.

The latter mode was suggested to me some years since by Peter B. the distinguished editor of the Horticulturist, for the purpose of pro[illegible] a[illegible]

herbaceous cuttings. In this margin of sand between the pots the cuttings were placed, there to remain until calloused and rooted, at which time each was taken out, with its block of sand attached, carefully potted in soil, repotted progressively, until it became an established plant.

I am not an advocate for forcing seedling strawberry plants to obtain an y development. By so doing we are not sure of obtaining a correct test of iness, much less of their quality; yet by the above method of potting, may be forced by taking the plant at the earliest stage of growth. But ocu nind that this practice is attended with considerable risk to the plant, as it is known that all potted strawberry plants are comparatively worthless they have once borne fruit.

It may be observed that I have not followed the custom of manufacturing compost according to professors, but rather trust to the principle of using a greater per cent. of heavy soil in the composition, inasmuch as it holds the fertilizing ingredient for a longer time, and the plants would suffer less in case of a few hours' neglect in applying water. These very light composts become exhausted by the plants much sooner; and not that alone, for the roots of the plant increase so vigorously that they soon reach the sides of the pots, which is just the thing that ought not to occur until the plant has nearly done fruiting. Furthermore, strawberries forced in this way are comparatively tasteless. On the other hand, strawberries raised in strong soil are of high flavor, both in open air and in-door culture.

For watering strawberries in the various modes stated, it is important to use potash-water once a week, the proportions of which are one pound of potash to a barrel of water.

The above is a condensed arrangement from notes made from time to time during a number of years, of my own actual practice.

GRAPE CULTURE IN THE UNITED STATES.

BY WILSON FLINT, SACRAMENTO, CALIFORNIA.

GRAPE culture in the United States is comparatively a new occupation of our people, and, like all similar enterprises, must meet with the difficulties which attend the lack of experience in all industries where their prosecution is made the necessary subject of experiment; hence a frequent interchange of opinions and the publication of the results of individual practice will tend to a more rapid diffusion of such knowledge in vine culture as shall insure success.

UENCE AND VALUE OF AN INTERCHANGE OF THE VIEWS OF VINTNERS.

ere theories are given and their discussion invited, there may be great e indulged in; but when statements of fact are to be made the utmost ection should be used lest error find its way to public credulity by of a high authoritative indorsement.

er is embodied in the published reports of the Commissioner of Ag- not only obtains a wide circulation in our own country, but is received extent as authority in foreign lands wherever distributed, because rom this important department of a great agricultural nation;

hence, where errors, either in statements of fact or of experimental demonstration have been admitted, it becomes the duty of those in search of truth to point out the mistakes and errors of the past wherever discovered. Hol these views, I trust that the criticisms I am reluctantly compelled to p two articles on the grape vine which appear in the report of the Departme of Agriculture for the year 1862, may be understood as having but one objec in view—reliable data on vine culture in the United States.

In the report of the Commissioner of Agriculture to Congress for 1862 wil be found the two articles spoken of, the first entitled "Climatology of Ameri can grapes," by James S. Lippincott, Haddonfield, New Jersey; and th other, "The grape and its improvement by hybridizing, cross-breeding, an seedlings," by George W. Campbell, Delaware, Ohio; both of which are abl productions, and, so far as they relate to vine culture in those parts of United States lying in the Mississippi valley and eastward to the Atl ocean, are of great practical value. Both authors, however, apply the scop of their observations to the area of the United States, and one of the gentl men to America, each affirming that the wine grape of Europe cannot be accl mated and successfully cultivated in this country. I quote the followin passages from the essays spoken of.

On page 196 of the report of 1862, Mr. Lippincott, when speaking of tl wine grape of Europe, remarks: "The constitution of the wine grape is n fitted to withstand these sudden changes from extreme humidity to extr dryness, and the plant and its fruit rapidly deteriorate in our uncongenial a To these causes may be ascribed the prevalence of 'mildew' and 'rot,' tl almost universal attendants of foreign vine culture in the *United States*, a which no skill can obviate, and from which no section has been found claimi exemption." On page 197, by the same writer, are several paragraphs co taining similar statements, from which I select a part of one only. Continu Mr. Lippincott: "*The only vineyards ever successful in America are those o American grapes.*" The italics are my own.

From Mr. Campbell's article, on page 209, I quote the following: "F many years the introduction of the foreign European varieties excited the ho of enthusiastic cultivators, who believed that in favored localities these grap might be acclimatized and made to succeed in open vineyard culture. Exp rience has in all cases proven the delusive character of these hopes; for aft a few years of partial or doubtful success, all such projects have been succe sively abandoned, and it is finally regarded by intelligent horticulturists definitively settled that the different varieties of the foreign vine, or '*vitis vin fera*,' are not adapted to open air culture in this country. The physical cha acter and constitution of the foreign varieties have been found wholly unsuit to the *climate of the United States.*" Again I add the italics. Let us look a few of the facts bearing on the culture of the wine grape of Europe in tl United States. The Catholic priests, who took a prominent part in all tl settlements of Spanish America, carried with them to the New World the *vi vinifera*, or black wine grape of Spain, which they propagated extensively all the mission establishments, where it is yet to be found, after a century cultivation, in vigorous and healthy bearing wherever they erected the cr from the Rio Grande of Texas to the shores of the Pacific ocean. In fact, t culture of the vine succeeded so well that about fifty years since, when mission establishments were at their greatest height of prosperity, very ex sive vineyards were cultivated, and a pure wine, the simple juice of their u equalled grapes, was so large a product of their agricultural industry tl was freely drank by all classes, even to the neophyte Indians. The rich n sion wines, as well as a species of brandy called *aguardiente*, at that perio also formed quite an item in the exports from California to Manilla, Mexi and Central America. At some of the missions records have been made of

character of each year's vintage through a period of upwards of eighty years; and there is not an instance mentioned where the grape crop was a total, or even partial, failure, or produced a wine of an inferior qualit . This is more than can be said for the best wine countries in Europe, where, during the past sixty years, there have been but eleven good wine crops.

Since the settlement of California by the Anglo-Americans, fifteen years since, the old mission vineyards have been extended and new ones planted over wide sections of the State. These vineyards are almost exclusively planted with the European wine grape, and cover a list of many hundred varieties, and include the choicest and most delicate sorts; and there are at this time not less than twenty millions of the *vitis vinifera*, or wine grape, in cultivation in the State of California; while it is estimated that the wine made from these vineyards this season will reach two millions of gallons. In fine, it may be stated that the wine grape of Europe has been acclimatized over more than one-fourth part of the territory of the United States; and if an estimate of numbers is made, it will be found that there are more foreign vines in cultivation throughout the nation than of all American varieties put together.

Believing that the above facts are a sufficient apology for consuming so much of the valuable space of the Commissioner's report, and that the reader will be as well satisfied as I am myself that it was an inadvertency on the part of Messrs. Lippincott and Campbell in not making proper exceptions of those localities where it is shown that the foreign vine is in successful culture, I will now proceed to make some observations on vine culture in the United States, but more especially in the locality of California.

THE ISOTHERMAL AND METEOROLOGICAL REQUIREMENTS OF THE GRAPE VINE

This branch of the subject is that upon which success or failure in vine culture depends, in a far greater degree, than on the constituents of the soil or the skill of the vintner. The isothermal and meteorological conditions of the atmosphere have such an immediate influence on the vine that any sudden unfavorable change will often ruin the crop, especially at that most critical period when the fruit is in the process of hardening its seeds. If the atmosphere is cold, damp, and chilly, the mildew may appear on the grape soon after the blossoms have set, and up to the hardening of the seeds, but not afterwards. The incipient grape during this period has an acetous exudation on its surface, which becomes corroded by the influence of the cold air, and forms the minute fungus called mildew. Or, to state the case more concisely, the grape mildew is an oxidization of the tartaric acid, always found on the surface of the leaves of the vine as well as the grapes during this period, but disappearing from the grape after the seeds have matured, because then the demands of the swelling pulp absorbs whatever of acetous matter is furnished by that most wonderful chemical laboratory, the leaves of the vines, while in their varied stages of growth. If during this period the atmosphere is dry, although at a low temperature, there will be far less danger of mildew than should it be a time of heavy rains. Even if there are heavy rains, the grape may escape from this great enemy if the rains are warm, with the same condition of atmosphere following.

No one will deny that the American grape is less liable to injury by sudden changes of temperature, accompanied by excessive moisture, than are the European varieties. This may be accounted for on the theory that the leaf on the foreign kinds is smooth and thin, and its acetic exudations more exposed to the weather, in consequence, than it is on the leaf of the American grape, which is thicker and stronger ribbed, and has a down on its under surface which secretes the acetous exudations, and protects it from so direct a contact with the atmosphere.

Near San Francisco, California, where the winds and fogs from the ocean are cold and moist, the foreign vine will not succeed on localities where the American sorts do quite well; hence the reasons which are conclusive against the cultivation of the foreign vine in the Atlantic States apply in all localities having a similar meteorological condition. The rot, which is never known in California, because of the absence of rains during the ripening season of the grape, seems to be the great scourge of the vintner in the Atlantic States and Europe, where rains are frequent while the grape is in an immature condition. Many are of the opinion that the grape rot is caused solely by long continued rains. This belief is true only in part. The superinducing cause of the rot arises from the fatal effects of what are designated as heated terms, when, for days, and sometimes weeks, the atmosphere becomes arid from a brazen sky, under a sunshine so intense as to scald the sap in the foliage of the vine, and parch its leaves to such an extent that the tissues shrivel up, and the free circulation of the sap is impeded or destroyed. This parching atmosphere, being succeeded by heavy rains, the leaves of the vines become saturated with an excess of moisture which they are unable to distribute, through their diseased functions, to the long famishing grape; hence decomposition takes place in the foliage, and as a consequence unwholesome food is transmitted to the grape, or sent to the terminal shoots, to produce enfeebled wood for subsequent bearing.

The American vine being capable of absorbing a greater excess of moisture than the European kind, because of the more porous condition of its glands, it follows that it is better suited to a climate where there are extremes of humidity and aridity than the latter. So far, however, as I have been able to judge, the American varieties will not as successfully withstand a dry brazen sky as will the foreign sorts. The reason of this is probably found in the fact, that the upper surface of the leaf of the foreign vine has a glazed consistency, which prevents the rapid evaporation of its sap under the intense rays of the sun.

As before remarked, the rot in the grape is superinduced by the diseased functions of the leaf, caused by sun scald, succeeded by soaking rains, when the leaves at once undergo a partial or entire decomposition, and prematurely drop from the vine, or hang on with their unsightly leprosy until the frost makes an end of them.

To me the most interesting study of the vine has been in watching the habits of the leaf. The leaf is to the vine and its fruit a combination of what all of the senses are to the human form, governing its being in all the relations of its vegetable existence as effectively as the senses do animal life. While the grape is in the acetous condition the leaf is similarly affected, and the moment the seeds have hardened so that the skins on the surface begin to have a tough consistency, it will be found that the leaves nearest the fruit on the bearing stem will also have undergone a change, and acquired a harder and drier character, and contain a less quantity of tartaric acid. So, also, as the grape advances towards maturity, the leaf will grow lighter in weight, and assume a grayish, brown tinge. Thus as the leaf ripens in ratio, under favorable auspices, will the grapes advance to luscious maturity. If the vine is denuded of its mature leaves when the grape is in process of forming its pulp its growth will be checked, or entirely stop; and although the fruit may ripen so as to become palatable it will have an imperfect color, and be insipid in flavor.

Too much care cannot be exercised in protecting the early leaves of the vine from injury; because on these we must always depend for an early and satisfactory crop of grapes. If there is an excess of foliage the vintner should remove that on other than the bearing branches, or if this is not sufficient, then he may cut off the ends of the shoots on which the grapes are growing, but never the mature leaves in the neighborhood of the grapes, unless such leaves are diseased.

SELECTION OF VINEYARD SITES IN THE ATLANTIC STATES AND PREPARATION OF SOIL.

It be noticed in various parts of the Atlantic States, and in the Mississ
valley, that vine growers are mostly in the practice of selecting rich land
r vineyards, and trenching this very deeply before planting their vines.
es a rapid growth of wood, which is feeble, and subject to injury by

in a (try where periodical rains can be depended on there is scarcely any
ior providing for the retention of water about the roots of the vine,
ne practice of digging deep trenches and miniature wells in which to plant
ine, is to provide it with subterranean acqueducts and reservoirs where
hy action in the root is impossible under such a condition. Experience
s that the vine, in order to be healthy, should be short-jointed, and of a
y" habit; a condition which it is difficult to attain on a deep and stimu-
soil.

t writers on vine culture recommend planting vineyards on a southern
astern aspect. Such situations are very favorable in seasons exempt from
terms; but when these occur, it will be found that a vineyard having a
western slope will suffer less from sun-scald, and ripen its superior fruit
n earlier day. Northwestern slopes always have a more equal isothermal
)n than those facing the mid-day sun. The true source of injury to the
the vine from extreme heat arises mainly from the refraction upon its
surface of the sun's rays from the earth; hence where the seasons are
ntly long it would seem to be desirable to plant the vine on the north-
rn slopes. Vineyards on such situations will be less liable to injury by
spring frosts.

With more care in the selection of soil and locality, vine growing may be
le a remunerative branch of agriculture throughout the northern and western
; but it will be found a matter of some difficulty to ripen the grapes
ently to make a wine of commerce, without an addition of cane sugar or
alcoholic spirits, which places such beverages under the classification of sophis-
s of the grape juice. There are many localities, however, in southwestern
uri, southern Kansas, Colorado, Arkansas, and northwestern Texas, where
ican vine, and probably some varieties of the foreign kinds, may be
to mature their crops in such perfection as to make a pure wine, free from
ous substances. In northwestern Texas there are large tracts of grav-
elly, volcanic soil, with an arid climate, much resembling portions of Spain and
Portu , where, no doubt, the European wine grape could be grown success-
, u es are selected with the same reference to soil and exposure as is
ry in Europe.

SELECTIONS OF VINEYARD SITES IN CALIFORNIA, AND PREPARATION OF THE SOIL.

season throughout the State of California, from May until November, is
of cloudless skies, under which the grape will grow everywhere exempt
dew and rot, except on low, moist, bottom lands, or near the shore of
, on that part of the coast north of Santa Barbara.

prevailing winds in the summer are from the colder latitudes of Behring's
become charged with a great deal of humidity as they seek admission
l through the gaps in the coast range of mountains, in the vicinity
isco. Rising from the sea in immense thick mists, sometimes with
s of showers of rain, these banks of fog are cold and chilly, but
ted upon the dry atmosphere before spreading far into the inte-
within a range of twenty miles of San Francisco they have a very
ct on the leaf of the vine and the young grape. Within the

sweep of these cold winds and fogs few European vines escape the mildew even the American grape is cultivated with unsatisfactory results.

Beyond a radius of twenty miles from San Francisco an entirely di climate is found, where the vine meets a congenial atmosphere. Exc these localities near the coast where cold sea breezes and fogs prevail, it n safely stated that all other portions of the State, lying under an altitude of thousand feet above the sea level, are suited to vine culture. In the State there are some one hundred and fifty-five millions acres of land, one of which, in my opinion, is well adapted to the production of wine. Now, we consider that in France there are but five millions acres in vine cultur much of this of an indifferent character, we can form some estimate of wh branch of industry will some day attain in California.

There are four general distinct localities in California with isotherma meteorological conditions as widely differing in their characteristics as the to be found varieties of soil. A segregation of these localities will divi State as follows: first, all that portion south of Monterey county, wit exception of the volcanic range of hills, near San Gabriel; second, all the ties lying west of the San Joaquin valley, and south of Yolo; third, the plains and rolling slopes in the Tulare, San Joaquin, and Sacramento va fourth, the foot hills of the Sierra Nevada mountains, as well as the e slopes of the coast range west of the Sacramento valley, and the districts al named lying north and east of San Gabriel, in Los Angelos county.

The first of these districts has long been celebrated for the abundance crops of large and luscious dessert grapes, and, until a very recent per furnished nearly the entire supply of wine for home consumption, as w export. The vineyards in this district are mostly planted on a sandy loa receive copious artificial irrigation in the bearing season. To this cause the soft moist atmosphere which prevails in the evenings and mornings, n ascribed the large size of its grapes, and the abundance of grape sugar they contain, when allowed to remain on the vines until fully ripe. F above reasons, this district of country is peculiarly adapted to the product heavy strong wines, and the distillation of brandy.

The second district being somewhat within the influence of the cool breezes, its grapes will contain less sugar; hence it is in this section State that we must look for light wines, and those particularly adapted manufacture of champagne; as these wines are naturally sparkling and what effervescent, without any sophistication. The light hock and pagne of the Sonoma valley have already obtained a high reputation Pacific coast and will compare favorably with the best European wine similar character.

The third locality includes much land similar to that in the first name with a warmer, dryer climate, as in this district there are seldom any which so greatly assist the formation of the unusually large grapes country about Los Angelos. This great interior valley locality will pr a rich sherry and sauterne, as well as a wine similar to the catalana or of the Upper Douro of Portugal.

The fourth, or mountain district, will doubtless produce the most va wines of any of the localities I have named, both on account of climate, is peculiarly different by reason of its elevation above the sea leve unevenness of surface, as well as on account of the favorable ingredient soil.

In all the valley or plain districts, the soil is more or less compos argillaceous, marine debris, mixed with sand, gravel, and alkalic, washed into what were then inland seas and lakes, from eruptive volcanoes. an altitude of two hundred feet above the sea level, there are the most dant evidences to show that all the great valleys in the State, were cove

, at no very remote period; but above this mark, the soil contains
ely any evidence by which an opinion can be maintained that it was
nder the dominion of the sea; and the wines grown on these lands will
a more delicate flavor, and possess a more abundant bouquet. In these
ainous districts are extensive tracts of chalky soil, where scarcely a
will grow. The vine, however, is made to flourish here, with a little
al irrigation; and if we may judge the future by the present, the time is
nand when the celebrated wines of the Johannisberg may find a worthy rival
erra Nevada. The seasons being long and dry, with the same liability
. on terms as in the Atlantic States, I consider it (a locality, having a north-
rn slope) preferable, in California, to a site facing the south and east.
much pains cannot be taken in breaking the ground up deep, for the
on of the vines in countries devoid of rain in the bearing season; hence
would recommend the reverse practice of that which would seem judicious
in rainy localities. In most parts of the State of California, the night air
is moist and moderately cool, owing to the sea breezes which constantly
blow inland; and it is this phenomenon which makes the climate so favorable
to the health of the vine. In the dryest situations and after months of rain-
less, cloudless skies, the leaf of the vine will always be found soft and full of
moisture in the morning. As a matter of experiment, to test the question as
to where the grape procured the bulk of its food, I have girdled the bearing
branches below the fruit stems, by removing the bark for the space of an inch,
entirely around it, at the time the seeds had become hardened, and yet the
grapes on such branches matured quite as well as on branches where this was
not done. In fact, I think they ripened earlier, and were quite as rich in
flavor. Of course, such branches never renewed their leaves, and when they
were in a growing condition at the time, such growth at once stopped, for the
reason of a failure to exchange supplies of nutriment with the roots. I recite
this experiment merely as cumulative evidence, going to show how much the
grape, in its later stages of growth, is dependent on the foliage, and how little
on any supposed supplies of nutriment from the roots.

It was thought, until recently, that the vine would require irrigation in California, in order to be able to mature its fruit. This notion is being rapidly exploded, because it is proved that where the soil is kept in a friable condition, by cultivation until after the close of the rainy season, the vine will make a sufficient growth of wood and foliage to mature the fruit, and furnish bearing canes for the succeeding crop of grapes.

PLANTING AND PRESERVING THE VINES.

Where it can be made convenient, it is best to summer fallow the ground intended to be planted with vines, as this will enable the vintner to commence operations, in setting the plants some weeks earlier, than if he is obliged to wait for the fall of sufficient rain to moisten the earth, so as to enable him to plow before planting. When the ground is in suitable condition, which it will be if summer fallow has been adopted, the vines may be set as early as Nov ber, even before any rains have fallen. If the planting can be done , cuttings which are taken from strong, well matured wood will be nearly to grow as rooted plants. When cuttings are used, they should not be t twelve or fifteen inches long, and should be inserted in the ground ne upper bud is just above the surface. By early planting, while the is warm, the lower buds on the cutting become stimulated, and remit to ottom of the cane sufficient sap to form the granulations, from which it itted simultaneously with the bursting of leaves from the upper bud op ing of spring.

e planting is delayed until spring, rooted plants only should be used; se will do best when planted in the fall. In moving the plants

from the nursery beds to the vineyards, great care should be exercised vent the exposure of the roots of the vine to frost or dry cold winds. rule is also applicable to the treatment of cuttings. No plant is more s on exposure to cold dry winds, or frost, than the grape vine, when in of removal from the nursery to the vineyard.

Much difference of opinion exists among culturists as to the proper apart in which to plant the vines, some contending that they should nearer than ten feet, while others would put them as near as three This should be regulated by the character of the soil, and the manner it is intended to prune and train the vines.

Where the vintner intends to train his plants like dwarf trees, wit from two to four feet from the ground, the vines must be set not less t to ten feet apart, or the spurs which are to bear the fruit will, in a fe so encroach upon the space that it will be difficult to get among the v the purpose of working the vineyard and gathering the fruit.

In a dry climate, like that of California, where it becomes an object t the ground, I find that close planting is best, if a system of pruning is in accordance. The best managed vineyard I have ever seen is that tin Alhoff, Coloma, El Dorado county, California. There are in th yard some sixty thousand vines, largely comprising Black Burgundy, C and several Hungarian varieties. The land slopes to the northwest, decomposed granite. The vines are set in rows, six feet apart by th and are pruned to low heads, which are formed but a few inches ab ground. The pruning which is practiced is that known as the annual system. Few canes are allowed to bear, but these are permitted to ha two to four bunches of grapes to the cane, according to the age and s of the vine. The bearing canes, as well as those intended for the suc year, are tied up to a stake four or five feet high, and the surplus shoots r from the stock near the ground, as well as the ends of the bearing canes has the effect of fully developing the fruit buds on the next years' ca well as giving great vigor to the leaves on the bearing branch nearest the

This practice of Mr. Alhoff accords with my own experience, whi since, convinced me that the best flavored and largest bunches of grap always to be found on those vines which had their bearing branches ne the ground. The best time of the year in which to prune the vine b bearing has been a subject of a great difference of opinion among vine g My experience teaches that if the object is to obtain a strong growth o the vine should be cut back soon after the fall of the leaves, late in By this course the buds nearest the ends of the spurs will be stimulated first flow of sap in the spring, and the new canes grow with accelerate by having received the entire force of the early-ascending sap. Bu object is to obtain grapes, late spring pruning is always most favorabl permitting the strong and copious first flow of the sap to pass along come distributed among the terminal branches, the buds, which are the for fruit-bearing, remain dormant until all danger of frost or chilling win have passed, when, on cutting the vine back to the proper place, the will throw out large, vigorous fruit-spurs, and the entire vine get un into bloom. I have never yet discovered any injury to the vine and th crop by what is termed the bleeding of the vine by reason of late spring tations; but, on the contrary, believe that not only is the vine exempt the late spring frosts by such practice, but that it is not as likely to suf mildew when this time of pruning is adopted. I have frequently pruning until the ends of the vine had expanded the foliage so that the were starting; but these same vines ripened their grapes quite as early in the vineyard which were pruned at an earlier season, and the grapes late pruned vines were almost always fairer, and the bunches larger t those which were dressed by the vintner in the fall or winter.

THE GRAPE HARVEST IN CALIFORNIA.

This joyous festive season commences in July and continues until December, it being earlier or later according to the locality where the particular vineyard may happen to be situated. At Woolfskills, on the Putah creek, in Yolo county, the mission grape ripens in July; while in Sonoma, not more than seventy miles distant, but near the cool sea atmosphere, the same variety does not ripen until October. One of the most favorable features in wine growing in California is to be found in the dry weather, which continues entirely through the ripening season. This has the effect of ripening the grapes uniformly. When a bunch of grapes seems to be ripe, every grape on that particular bunch will be found equally ripe. So favorable is the autumn to the grape, that no signs of rot are ever discovered, and the earlier ripening bunches will often be found hanging on the vines perfectly cured raisins. This favorableness of season gives to the grape an abundance of grape sugar, which, in the process of fermentation, becomes grape alcohol, and thus accounts for the strength of California wines, making them equal to the strongest European, and not requiring any addition of alcohol distilled from grain or cane sugar, as do most European wines, as well as the wines of the Atlantic States. Having stated at some length the advantages of the climate and soil of California for wine growing, I can only add, that as there are many millions of acres of the best land on the globe in that State suited to vine culture, which can be had on the national domain for the mere occupancy, all that is required to make this one of the greatest of American agricultural industries is the fostering care of the government while it is yet in its infancy. Once open the Pacific railway from the Sacramento valley to the Mississippi, and the Golden State will supply the epicures of the populous Atlantic communities with the White, Muscat, and Black Hamburg grapes, surpassing in open field culture the efforts of the most skilful attempts under glass by the horticulturists of the east.

WINE MAKING IN CALIFORNIA.

In Europe or the Atlantic States where, on account of the unfavorableness of the climate, the grape is not well ripened, or becomes too watery on account of frequent drenching rains during the wine-making season, it becomes a science to know how to manipulate the juice of these imperfect grapes so as to make a tolerable wine which will have a general uniformity for successive seasons. For these reasons wine making in the Atlantic States and Europe must be classed as a manufacture, instead of a production, as in California, where it consists simply in expressing the juice of the grape. Indeed, wine making on the Pacific slope is a very simple operation when compared with this business in the wine countries of Europe, and it may be described in a brief sentence as follows: Allow the grapes to remain on the vines until thoroughly ripe; then press the juice into clean, sweet vats or fermenting casks, and keep these filled up from time to time, while the fermentation is going on, until the lees are thrown off; then draw off into other sweet, clean casks, and bung up not very tightly, and the work for the season is done. Close watching, care, time, and patience to wait, will afterwards accomplish the rest.

An analysis of a white and red California wine by Dr. Craig, at the laboratory of the Surgeon General, Washington, shows the following results:

rt or red wine, $16\frac{5}{10}$ per cent. grape alcohol; $4\frac{4}{10}$ grape sugar. Hock or wine, $13\frac{4}{10}$ per cent. grape alcohol. The wines were pronounced pure.

wines were made of the Black Mission Grape, the Hock being the ran from the press before fermentation took place, with the skins m the fermenting vats. The coloring matter is obtained from the grapes, and it is also seen that where the fermentation took place, p included, a greater amount of grape alcohol was obtained, as in the analysis of the red wine.

WINE.

BY FREDERICK BOSSERT, NEWARK, NEW JERSEY.

THE MANUFACTURE OF GRAPE, BLACKBERRY, AND OTHER FRUIT WINES, ON GALL'S METHOD, WITH A FEW REMARKS ON THE CULTIVATION OF THE GRAPE VINE IN GERMANY, FRANCE, AND THE UNITED STATES.

It is a fact generally known at present that the juice of the grape, in order to furnish, by fermentation, healthy and well flavored wine, must contain sugar, water, and acids in proper proportion, from which it follows that grape juice deficient in this normal proportion, and consequently the wine to be made by fermentation, can be improved by corresponding additions of sugar and water. On this principle is based the method pursued for many years by French and German manufacturers of, and dealers in, wine, and subsequently published by Gall, of adding sugar to grape juice deficient in it, and of adding sugar-water to such juice as may contain too large an amount of acid. In France and Germany this mode of improving wine is principally applied to wines from unfavorable localities, and more generally during unfavorable years. But in the middle and northern States of this country, where failures of crops are more frequent in quantity than in quality, and where many grape vines are bei planted which contain, when perfectly mature, a sufficient amount of sugar required for a table wine, (with, however, a surplus of acid,) this improvement of wine will always be used with some kinds of grapes, while it will never, or rarely, be needed with others.

Wine calculated for daily use should not contain more than from 8 to 12 pr. ct. of alcohol, (spirit of wine,) nor from over 5 to 6 pr. ct. of acid, and as one out of two parts of sugar are converted by fermentation to alcohol, 100 parts of the must of the grape should contain from 5 to 6 parts of acid, from 16 to 24 parts of sugar, and from 70 to 79 parts of water.

In regard to ascertaining the amount of acid and sugar, my method is similar to that of Gall. In order, therefore, to avoid useless repetitions, I refer for this and the mode of conducting the process of fermentation to the detailed extract given in the report of the Commissioner of Patents, (Agriculture,) 1860, pages 322 and 358.

The juice of the Isabella grape used by me, though satisfactory as a table grape, having a pleasant and sweet taste, contained, notwithstanding, when measured, so great a surplus of acid (11 to 12 pr. ct.) that the wine made of it would not have been palatable at all but for the addition of sugar-water.

In order to make white wine from the Isabella grape, (a method which be applied to all kinds of dark grapes with colorless juice,) I mash the grap either in the bunch or the berries after being separated, remove the juice as quickly as possible from the skins, determine the amount of acid and sugar, make the required addition of sugar-water, put the must in casks of about 160 gallons, and let it ferment in a cellar with a temperature of from 60° to 70° Fahrenheit.

In order to make red wine the mashed grapes are put in fermenting vats of about 200 gallons each, covered up and allowed to ferment. The skins thrown to the surface by the process of fermentation are kept under the surface by a perforated cover. When the fermentation ceases the wine is racked into a cask; then warm water is poured upon the remains in the fermenting

allowed to ferment. The fermentation being over, the liquid is again
n 1 off and mixed with the wine. It depends upon the amount of acid
nt in this mixture whether another addition (and if so, how much) should
ce e in order to mix it with the wine already drawn off and the product of
t addition, and thus to obtain a wine of a normal amount of acid. Sugar-
wa de of one gallon of water and two pounds of sugar furnishes a pleasant,
y strong wine, even if the grapes used should be quite destitute of

In preparing sugar-water I use only white refined cane sugar. Grape sugar, it is true, has some advantages in regard to fermentation, but the article of commerce is very impure, containing sometimes as much as 40% of gum, dextrine, &c., so that the wine frequently receives an unpleasant tang, and the advantages of using grape sugar (aside from its high price) are thus amply outweighed by the disadvantages produced by its impurities.

In the year 1862 I sent a few samples of wine, made according to this method, to Germany, with the view of having it tested by a reliable gentleman, well wn for his experience and knowledge in matters of wine. He pronounced wi to be Neckar wine of a year's growth. When afterwards informed wine had come from the United States, he produced from his own cel-
lar a ple of Neckar wine of striking resemblance. He pronounced the
wine not only very good, but gave the assurance, from his own best
, that every wine-grower in the best wine-growing countries of Ger-
would be glad if he could produce, each year, an article of the same
y. It was, moreover, not only his, but the opinion of others equally as
, that this wine would keep from ten to fifteen years—on the whole, as
s good Rhine and Neckar wines would.

In this country, too, this wine has been gaining favor on many sides, and the prejudice against native wines is gradually giving way, as an impartial
n of these wines with those imported and mixed with alcohol, or alco-
ma water, and of the same price, must unquestionably result in favor of the

experiments heretofore were merely confined to the Isabella, not having been able to procure sufficiently large quantities of other kinds of grapes. Sh l I succeed this next fall, I shall at once extend my experiments to other
of grapes.

In the fact that in the Agricultural Report for 1862, page 494, mention
ne of the blackberry wine, I feel induced to communicate my method
king said wine in 1859. Wild-growing blackberries were mashed and
ed to ferment for three days in a covered vat; they were then pressed and
juice put in a cask, filling up two-thirds of it. Warm water (as much as
juice obtained amounts to) is now poured on the pressed remains. After
lapse of three days the infusion was pressed, and the liquid thus expressed
to the wine in the cask. White sugar, three pounds to the gallon, was
dissolved in this mixture. The cask was finally filled up with sugar-
of the same strength, (namely, three pounds of sugar to one gallon of
Late in the fall or in spring the wine is drawn off the dregs into a
bottled the next fall.

prominent physicians of Newark, N. J., successfully prescribe this
ns tonic and gently astringent qualities in cases of chronic diarrhœa,
complaints, &c.

manufacture of this, as of all other wines made of fruit, it would be
ect, re scientific, and more certain to produce favorable results,
t amount of acid and sugar contained in the juice of the
rmine the needed amount of water and sugar, so that the
and acid of the fruit-wine shall be equal to the wine calculated
laga, Madeira, &c.

Here I wish to add two remarks concerning the culture of the grape vine in the middle and northern States.

In Germany and France the southern and southeastern hill-sides are considered as best adapted for vineyards.

The more gradual increase of temperature in spring and the proportionately short summer season, with generally warm and but few hot days, render it necessary that the vineyards should receive sufficient warmth, through the direct rays of the sun, in order to mature the grapes. But it is quite different in this country. The warm temperature sometimes setting in for some consecutive days as early as January and February, frequently causes the grape vines on the southern sides of the hills, where the effect of the sun is most powerful, to vegetate at this early season only to be checked in its growth by later frosts. Thus they freeze and become sickly, and the crop of the year is either destroyed or reduced. On the north or northwest side of the hills, where the ground is less warmed by the rays of the sun, and where the soil remains longer cold in consequence of the action of cold winds, snows, &c., a few warm days in winter will not be able to force the plants, which, therefore, remain inactive until the approach of the regular warm season, when there is no longer any danger of their growth being injured by frosts. There is no danger from the retarded development either to the fruit or to the plant, as the hot summer and the long-continuing fall will always bring the fruit to maturity; but there is danger from every disturbance after the growth has been started. This view receives confirmation from the superior thriving condition of the grapes on the shores of Lake Erie and in the woods. There the north winds and the ice of the lake keep back the development of the grapes until summer. On a northern exposure absence of the effects of the rays of the sun performs the same object.

In Germany the leaves of the grape vines are partly removed, so as to allow the rays of the sun to act directly both upon the fruit and upon the vine. This method is made necessary by the lower degree of temperature, and there is no danger to the grape vine from the action of the sun's rays, their effects being weaker than here even during the hottest part of the summer. In this country not only the crop, but also the health of the grape vine is frequently destroyed by the removal of the leaves, as I have been assured by many German wine-growers who attempted to apply the method used in Germany. Aside from the practice pursued in warm countries like Italy, nature herself would, in fact, seem to teach us that the grape vine during summer requires protection from the hot rays of the sun, as vigorous, wild-growing grape vines are only found in forests and winding around trees. I would, therefore, recommend to grape-growers the experiment of so putting up their espaliers that the rays of the meridian sun will fall parallel with the espaliers, thus striking but a small portion of the leaves, and especially those that project furthest, whilst they will heat the soil, which, during the night, will radiate towards the grapes the rays absorbed, thus keeping up a uniform temperature day and night.

In none of the accounts given by the large number of persons who have travelled over the United States, did I ever meet with observations by which the correctness of my view in regard to both these questions might be determined. In these reports I miss especially the statements whether and in what localities vineyards are planted in positions exposed to the north and northwest.

CAVALRY HORSES IN AMERICA.

BY FRANCIS MORRIS, OF NEW YORK.

THE present civil war is unexampled in the annals of the world for magnitude and persistence. Two portions of a mighty nation divided against each other, and using the utmost efforts of warlike skill and ingenuity, render the conflict singularly interesting as a study of the arts of offence and defence. The world learns new military lessons with every year that this immense struggle continues.

At the outset the whole country was startled, and in a measure paralyzed. Our army was but a few scattered regiments, totally unfit for the gigantic task thus forced upon it. As the people awoke, the necessity for instant action was met by an enthusiastic generosity worthy of the highest praise, and men and money were offered to the government with a lavish willingness that showed how deeply the spirit of patriotism is implanted in the American bosom.

Simple earnestness, however, can accomplish little without efficient means; and, in some particulars, the armies that flocked to the national standard were quite unequal to the enemy they were called to meet. This was notably the case in the cavalry arm of the service.

As it was supposed that the outbreak was merely a local insurrection, to be quelled by a limited exhibition of military strength in a comparatively brief space of time, infantry and artillery were chiefly relied upon. But as events succeeded each other, and a few battles took place, it became painfully evident that mounted soldiery were necessary, and in formidable numbers.

It was then that the loyal men of the north were deeply mortified at the discovery that they possessed neither horses nor riders worthy of sustaining the glory of a legitimate cavalry service. The further western States alone produced good cavalry.

While dishonest contractors and knavish speculators were foisting spavined and foundered hacks upon the government, and awkward officers, fresh from the counting-house desk, were drilling day laborers to ride them, the dashing raids of the rebel General Stuart filled us with shame and dismay. He and his rough riders galloped across the country at their will, stealing and seizing whatever pleased their fancy, and frightening the peaceful farmers for miles around. Soon the brilliant but traitorous cavalry of General Forrest followed this example, and Fitz Hugh Lee, Imboden, Moseby, and Morgan followed in turn. Trains were burned, villages laid under tribute, guards taken prisoners, telegraph wires cut, and railroad tracks torn up, wherever these raiders went, to the consternation of civilians and the deep humiliation of the army.

And, referring to the subject of railroad tracks, the folly of trusting to the railroad as a means for the transportation of armies, and their equipments, stores, &c., without adequate protection, has been severely illustrated by these same cavalry raids. To intrust the lives of our soldiers and the property of the government to the melancholy chances of a burned bridge or a displaced rail is unworthy of any enlightened people. Long lines of unguarded railroad running through semi-hostile sections of country, and easy of access to all well-mounted troops, are totally unfit for the safe transit of men from one department to another. Our daring cavalry hero, Grierson, did more service to the north in destroying the southern railroads on his famous raid through Mississippi and Louisiana than those railroads had done to the south. It is to be

noticed in this connexion that the horses used in that instance were of Mississippi blood stock.

All truly great armies have been abundantly provided with cavalry. Napoleon, deprived of his mounted soldiers, would have achieved but little worth recording in history, Since the night when Diomedes and Ulysses went upon a classic raid to capture the horses of Rhesus, the cavalry has been esteemed the most honorable branch of military efficiency. A contemporary writer has well remarked:

"For ages after the siege of Troy the back of the horse was the true throne from which warrior-kings ruled the world. He carried Alexander to India, and Tamerlane to China. He enabled the Persian king to use the bent back of a Roman emperor as a step from which to vault into the saddle; but ere that, he leapt with Marcus Curtius into the gulf in the forum, and saved Rome from a fate worse than that which overtook Pompeii and Herculaneum."

The immense army of Hannibal, with which he fought the battle of Canna, where forty thousand Roman heroes bit the dust, was not less than one-fifth cavalry. Without this important aid, that great warrior had hardly been able to cross the Alps. By the superiority of his Numidian horses he defeated the ill-mounted Romans at every turn, destroyed their towns and cities, dashing through the land like a whirlwind of fatal power and rapidity, and leaving his enemy to gape and wonder over the ruins these gallant horsemen left to mark their passage.

The railroad is of vast assistance in the carrrying of heavy stores, and large bodies of unmounted troops which must be moved with great speed, to meet a sudden emergency; and then it requires large forces of efficient cavalry to protect it. Attacks upon roads are generally made by horsemen, and neither infantry nor artillery can move rapidly enough to be capable of successfully resisting them. Every important line of railroad or telegraph that lies exposed to the action of the enemy should have a numerous force of mounted guards to patrol and protect it. Against cavalry raids nothing but cavalry will suffice, while in battle it is equally valuable with the other arms of the service; and in this particular we have failed to meet the south upon terms of equality. Her cavalry has been her strength; ours has proved our weakness. After winning a glorious victory, we have been compelled, more than once, to sit quietly down in camp, to see the enemy retreat safely, even when in disorder, to his strongholds, simply for the want of some thousands of good troopers with fleet, thoroughbred steeds, and trusty sabres, to follow and harass the rear, capture detached bodies, seize lingering trains, artillery, &c., and, converting a retreat into a rout, make a second Waterloo.

There was at one time no hour when the mounted hordes of the rebels might not have penetrated our borders, and even into the heart of our country. Every raid that they have ventured upon took us by surprise, and we have not had, nor have we now, enough troops of the same kind to intercept the marauders. The way was cleared by Stuart's cavalry for Lee to enter Pennsylvania last summer; and for all that we could have done, Stuart might have ravaged all that State, and the greater part of New Jersey besides, before we could have prevented it.

Having taken a view of the necessity of a large and efficient force of cavalry in the armies of the north, it may be in place here to analyze a little the causes of southern superiority in that direction.

In the happier days of the country, when peace sat upon her throne in the heart of the nation, and abundance smiled everywhere over an undivided land, the south was the home of a noble institution—"the turf." Every planter of means plumed himself upon his stables, and no southern town of any magnitude was without its race-course. In this way the breeding and raising of blood horses was made the pleasant occupation or pastime of nearly all gentlemen of wealth, and the equine stock of the south was improved generation after gene-

until thoroughbred horses were almost as plenty as those of mixed or el descent.

every southerner learns to ride while a mere child, and is perfectly in the saddle long before he arrives at manhood. Hence, when the began to demand serious action, the young men of the rebellious States lly formed themselves into cavalry organizations. Not unfrequently soldier furnished his own horse, and often this was a thoroughbred of conble fame, won in hard-fought contests over the Washington course, at on, the Metairie, at New Orleans, the Savannah, Augusta, Mobile, and courses.

universal prevalence of horsemanship was due undoubtedly to a variety es. The proverbial badness of southern roads is inimical to the use of , save of heavy and ponderous construction; many roads pass through d fields, with numerous gates, and the streams are deficient in bridges. urial character of the people, also, led to a fondness for the vivacious ent of the race, and its popularity with the fairer sex lent an additional to the annual meetings where a *Peytona*, a *Monarch*, a *Fanny King*, a *Vervier*, a *Lexington*, a *Lecomte*, and hundreds of others made their appearance or the contest. Compared with the running race, trotting was a rare occur- and the result was precisely what might have been expected. There othing so much improves the breed of horses in any country as a liberal gement of the running race, to which England owes the rare beauty ie of her horses.

all these circumstances it is not strange that the south should have out bodies of excellent riders, mounted upon steeds of extraordinary and endurance. Exception has been taken to the expense of the ary, but the enemy has unquestionably found it the most valuable of all, ortion to the money expended.

ever objections may be made through prejudice or a false idea of moty against organized trials of speed between thorough-bred horses, they e, beyond a doubt, been of the greatest benefit to the cavalry of every y that possesses an army. The scions of racing stock are infinitely sur to the bastard hacks of the farm or the city railway stable; and this is so well known and appreciated that the simple name of a remote ancestor of rity, duly authenticated, suffices to render a colt desirable before he has wn any qualities of intrinsic excellence. Queen Victoria, a lady of more ordinary refinement of taste and Christian principle, and gifted with the ical virtue of common sense to an unusual degree, not only encourages the ification of equine blood by the retention of a magnificent breeding and ng stud—that of Hampton court—but by visiting in person the more interaces, and donating truly regal prizes for the contest.

and this is, furthermore, the practice with many other European sovereigns. are too lofty or too dignified to take an active part in a matter so imt as the elevation and improvement of their national breed of horses. It strange, then, that our government should take so little interest, amount- fact, to almost total apathy, in so vital a subject.

ps the American nature, especially in the north, has been a little too d with immediate affairs, commercial business, and the like, to fully the amusement and the benefit to be obtained from the turf.

ers visiting this country often notice and comment upon our worried, anxious expression; and it has frequently been said that we are deholidays. New England, where business of all kinds is particularly y active, has never since her States were colonies been able to rough-bred horse, with the exception, perhaps, of "Balrownie," imported in 1857 by Quincy A. Shaw, a public spirited gentleman

The expense of establishing fine studs and running stables may have l alarming to the practical, busy nature of her people, and government pa age will be necessary to allay their fears, perhaps, concerning a loss of commercial reputation. Malicious persons also might say that they ol racing, as Macauley says the early Puritans objected to bear-baiting, because it gave pain to the bear, but because it gave pleasure to the tors."

Undoubtedly, the practice of betting is intimately associated with the but so it also is with elections. Could any sane man object to the ele privileges because unprincipled persons invariably make it an occas wagers?

Another reason, perhaps, why the racing of horses has been somewhat l in disfavor is the unsettled and loose state of our social condition. Many ca "respectable families" have not felt sure enough of their own position to gle with those who were considered questionable on the point of morality, have sought to render themselves secure by an ultra degree of virtue, tha while it approached very nearly to pharisaism, left nothing for prying neigh to inveigh against. Surely, if racing should be prohibited because g bet upon the issue, railroads might be abolished on account of the bulls bears who "operate" dishonestly in stock.

For these causes the people of the north have been far too indifferent to improvement of their horses, and it is hardly too strong a statement to that this fatal indifference has indirectly cost us thousands of lives u battle-field and millions of dollars during the progress of the present war.

Hereafter, however the issue may be decided, a strong standing army be requisite, and a goodly proportion must be mounted. The best arm world has seen have been largely composed of cavalry, and, instead o proportion being only about one-tenth, as is now unfortunately the case, shall probably need not fewer than one-fourth of the whole army mounted.

Of what vast and vital importance, then, is the raising of a good and stock of horses, pure in blood, and possessing the qualities of speed, cou and endurance, without which the animal is merely an encumbrance to cavalryman.

The greatest cavalry charge of which modern history takes cognizance, one which has been nobly celebrated in immortal verse by the poet laureate Great Britain, Alfred Tennyson, was that of the famous "light brigade" Balaklava. It is a note-worthy fact that the animals ridden on that oc by the fearless heroes who followed "the last of the Cardigans" were all thor quarters bred, and each one cost three hundred pounds sterling.

And not only does the well-bred horse signalize himself by his swif and power of endurance, but his intelligence renders him more fit for the du of military service than the horse of ordinary breeding.

The cavalry drill requires more practice than any other, for the very reason that each movement must be performed by two individual beings and horse. It is requisite, therefore, for the man to have more intelli than the one who can carry a knapsack and walk straight, and for the to have finer instincts than the poor brute that drags a plough or a cart morn till night. Instances of superior instinct displayed by well-bred an of all kinds are too numerous to leave room for any doubt whatever upon question.

All the agricultural societies of Great Britain have recently determined to give a certificate for any stallion as a breeder of hunters—the best of alry horses—without satisfactory evidence of pure blood and a record of cesses upon the race course.

It is not every one who knows the meaning of the term thorough-bred applied to the horse. Originally in Arabia the horse was a member of t

ld. It is possible that those physiologists are right who think that animals acquire intelligence in proportion to their association with ny anecdotes of unquestionable veracity would at all events support ory. Be this, however, as it may, the life and needs of the Arab tended y way to make him solicitous for the improvements of his horses. Tests d and power were of constant occurrence. There were caravans to be d and swift escapes to be made. A girl with several suitors made them on horseback in a race with her, the one who first overtook her being appy man." Thus the fastest horse gave celebrity to the owner, and e pride of his family. This pride is well illustrated by a curious story Arab who believed he possessed the fleetest mare in the tribe. One was stolen. He was in despair, but mounted his next best animal ne in pursuit of the thief. Coming in sight of him, the owner put his o its best pace, and the chase became exciting. The robber cheered on re, his pursuer followed like the wind, and finally began to draw along At this juncture his pride in the cherished animal, the glory of the fam- the better of his desire to regain his property. He could not bear to r beaten by an inferior horse; so he cried out, "Touch her in the left with your heel!" The thief profited by the secret; the mare redoubled ce, and soon left her unhappy proprietor to console himself with the edge that, though he had lost her, she had never been defeated in a race. as a descendant of such stock as this, imported into England by Darley, Queen Anne's reign, that originated the beautiful animals that now for the prizes of the British turf. Darley's example was followed by . Pedigrees were carefully preserved. The English stud book became tution. Racing was organized and regulated as a test, and the thorough- s perfected. It was in 1732—the year of Washington's birth—that nglish thorough-bred horse was acknowledged as the best in the world. this period, or very little later, the matter attracted interest in this y. The cavaliers, then recently settled in Maryland and Virginia, to the sports of home, and imported stallions sired by the most famous of the Old World, such as the Cullen Arabian, Darley Arabian, Flying rs, Curwen's bay Barb, and many others of high celebrity.

offspring of these noble animals made the southern cavalry what it was; s of them has reduced it to what it is. Now that they have no more ghbred cavalry steeds, and are compelled to use the northern horses ay capture, we are on nearly equal terms in quality, and far ahead in rs.—(See "Wilkes's Spirit" of August, 1863, on this subject.) Natu- as the Arabian was the original progenitor of the English horse, un- ag persons claimed him to be superior, without considering the inestimable nges of organized training and testing. Arabian horses, however, im- to England were invariably beaten by the native animals. It was that the climate was unfavorable to such high-bred creatures, and me, in their own country, they would be found superior. To test Nell, an Irish mare of some celebrity, though by no means a first- , was procured by the English merchants of Cairo to run ten miles t sand. She won the race with ease over all the Arabians entered More recently the question being again renewed, Ali Pacha ran e of his magnificent stud—the finest in Egypt—against a very racer, Companion, and was badly beaten—Companion win in a canter by more than half a mile. Again, last year an Ara vanquished all the noted horses at home, and was brought to oughly acclimated, in the contest for the Goodwood cup, a a half miles, with twenty-eight pounds allowance in his favor, stranger was beaten out of sight, although the pace was so

slow that the running did not fairly commence until within three-quarters of a mile from the winning post.

And it must be confessed that the American thorough-bred, though su to the Arabian, is not equal to the English.

In 1856 several celebrated horses were taken from this country to England for the purpose of comparison, and they were allowed fourteen pounds advantage in running for the Goodwood cup. Of these, Lecomte ran but one race, and was easily beaten by the English horse Fisherman; Pryor ran for the Goodwood cup, and was beaten; Prioress, in the same race, might possibly have won under more favorable circumstances of riding, &c. She afterwards won the Cesarewitch stakes at Newmarket, and this was the only success of American horses in England the first year of their sojourn. It must be allowed, however, that Pryor and Lecomte were never in good physical condition there; both died in the process of acclimation. The result of all this has been ascertained to the satisfaction of those interested.

There can be but little doubt that the best horse of the year, in England, can give any American horse yet produced fourteen pounds allowance, and beat him in a race of two and a half miles, though the authorities of the English turf have reduced this allowance at the Goodwood races to seven pounds. Mr. Tenbroeck, who took over these horses, has since taken others, among them Umpire and Starke. The former ran with success as a two-year old, and was first favorite for the Derby, but was signally beaten, not being in the race for more than the first mile.

We see that the country in which the race is most permanently established as a popular institution, and most largely patronized by the better classes, produces the best horse. The deduction is, therefore, that public trials of speed and endurance tend to improve the stock of breeders. The race is simply a test of the animal's power—a proof of how much he can carry, and how fast he can carry it. Everything in this world requires a trial of some sort, and the more regularly organized it is, the greater the improvement. This general law is of universal applicability, and it may be safely laid down as a rule, that for the purification of blood and breed in all animals, from the human down, some competitive test of power and ability is requisite; and this is precisely the object and the result of the running race.

It is not uncommon to hear ignorant persons talk of thorough-bred trotting horses, but the animal is a rare phenomenon. There may be, doubtless, some instances of the real thorough-bred trotting well, but the trot is entirely an artificial gait. The wild horse, in his natural state, never trots, though the untaught foals of good trotters sometimes take that gait. It must be remembered also that no trotter has ever shown courage, endurance, and mettle whose pedigree could not be traced, with more or less directness, to good racing stock and the best pedigree that the much praised Morgan and Black Hawk boast is a somewhat remote descent from thorough-bred ancestors on one side at least, and the horses of those lineages transmit only the virtues of racing blood in breeding. The most celebrated trotting stallions of to claim to be descended from the famous Messenger, among which may be tioned Hambletonian, Abdallah, Mambrino, and others. Trustee, that tr twenty miles within an hour, was out of a Messenger mare, by the famo of Fashion. With this stock, what is called "in-breeding" has produ markable results in the way of improving successive generations.

The many good qualities, too, of the Canadian pony are due, without d to the early importation, by English officers, of valuable racers to Canada fact, by tracing back a little the history of horse-flesh, in every region of e try where the horses are uncommonly fine, it will be found that thoro stock has been there at different eras. Monmouth county, New J famous for its fine horses, and it is well known that racing v

in the olden time, and more recently every farmer who could has
the service of the blood horse from numerous training stables in that
the e. Dutchess county, New York, is another celebrated place for
ock, a was long the home of imported Messenger, traces of whose blood
se everywhere in that locality.

d use of good material is having a marked effect upon the trot-
everywhere, and unconsciously those who talk of "pure trotters,"
n in higher estimation than racers, are breeding them to be more
like the latter. The form of the trotter has undergone a wonderful
within the past fifteen or twenty years. The broad chest is no longer
, for the gait has become different, and the trotter, instead of putting
feet down directly under his fore feet, lengthens the stride by throwing
on each side beyond the fore feet. Thus the deep, narrow, gray-
style of chest is now the thing to be sought, and the hind leg is longer
he hip to hock, giving a greater power of reach. In a word, the trotter
ving, and therefore growing to look and travel more like the racer.

t impossible that if thorough-bred horses were educated and trained
solely, and bred in the best manner for preserving hereditary qualities,
ough-bred trotting stock could be produced. At present, however, there
uch thing, and our most celebrated trotters are merely mongrel horses,
dash of good blood, which they may or may not transmit to their pos-

the English system of racing has resulted in the finest breed of horses,
properly consider that system the best. Here we run long distances
ght weights, and around a circular course, whereon the rider rests his
at several points, by what is called "taking a pull." This occurs at the
of the course. The English race, on the contrary, is a short dis-
with heavy weights, and upon a straight course. The weight for three-
old, in England, generally is one hundred and nineteen pounds, while here
ut eighty-six pounds. Lately it has been increased, upon some of the
to ninety pounds, but that is by no means weight enough to properly
he carrying powers of the horse.

The English course also, in many instances, comprises undulations which
erably vary the level of the ground, and the care required in managing
r so as to save him for an ascent, keep him from fretting, and bring him
home stretch in the very best condition for a final brush, makes English
s unequalled. It was more the American rider than the American horse
st the Goodwood cup for Prioress.

nother excellent racing institution peculiar to England is the "handicap."
is an attempt to equalize the ability of the various horses by weighting.
od horses are compelled to carry more than the standard weight for
, and the poorer ones carry less, according to the judgment of the
pper," generally one of the first gentlemen of the land, frequently a
, and always as far above any suspicion or reproval as the Chevalier
nself. In this race, notwithstanding all allowance which may be
"dark horses," those whose powers are kept private, with reference
ecial handicap, both the handicapper and the public are often aston-
he result. The last horse dreamed of as a winner is just as likely to
palm as the favorite. The necessity of a continuous and regular
st by racing, instead of relying upon anything so fallible as human
ds an apt illustration in this fact.

Above all these urgent and strenuous arguments in favor of the
dded the pleasure it gives to every liberal and right minded
ht of a number of beautiful and thorough-bred horses, thin
build, but strong as if made of whalebone and steel, going
, flashing down the home stretch like living thunderbolts, and

arriving at the goal amid the deafening plaudits of an enthusiastic thro winning horse wet, foam-flecked, exhausted, but proud and fearless, sna with his rider the pleasure and the pride, intelligently anxious for his repu tation, and splendid in his victory. All this is a true enjoyment, which can not debase that part of our nature which craves rapid and tumultuous se tions. When, as in England, the bright eyes and comely toilets of ladies, b born and lovely, illuminate the scene in elegant equipages or mounted on der, satin-skinned thorough-breds, hardly less beautiful than those upon course, the charm of the spectacle is vastly greater. He who has once t the delights of the race as it exists in England, and should exist here, never lose his admiration of so wholesome and innocent an excitement.

It has been pretty fully shown in the foregoing remarks that thorough-b horses are a necessity with any nation that desires its armies complete in department of the mounted service, and, further, that these horses are only n be obtained by a liberal patronage of the institution of racing. It may now necessary and proper to examine into the various methods of breeding h for the colt must give promise if the horse is to realize success. Racing n training; it develops whatever qualities, good or bad, the animal may poss but it can hardly make thorough-bred out of mongrels.

In-and-in breeding may be resorted to for some generations to produce bred stallions, but great care and judgment should be exercised in the experi ment. The aristocracy of Spain, "the *sangre azul*," is a sad example of l intermarriage between relatives, and nature revolts at its perpetration. T result of this in the horse, as in the human species, is to inaugurate a scrofu lous tendency, with the usual train of dire evils. It is not so prompt, howe with the animal as with the man, because the life of the latter is more artifi and unwholesome in all particulars. In-and-in breeding makes the foal deli cate, slender, and mettlesome, and intensifies all the prominent characteris of the stock. This may be a highly valuable process in some cases, but i continued too long the blood must inevitably become tainted. The test o racing should be constantly and regularly employed, that the breeder ma judge when he has exhausted the capabilities for improvement that this sys tem offers. So soon as the foal exhibits a thickening of the jaw-bone and largement of the glands—an incipient scrofulous symptom—in-breeding sh be stopped, for a continuance of it would surely destroy the blood of the stoc

It must be remembered, in this connexion, that the most sought and cessful stallions in the history of the turf were in-bred. The most remarka racers, perhaps, have been an out-cross from in-bred stock; but it is noticeab that these have rarely, if ever, sired valuable colts, except from mares of t dam's lineage.

From these facts, gleaned from unquestionable sources, we must decide h in-and-in breeding is an absolute necessity to the production of thorough-b stock, and when employed with judgment and intelligence, capable of the ha piest results. The same laws appear to govern all inferior animals in th particular. The pigeon is a singular example among birds. The rapidit with which it reproduces is favorable to the experiment, and breeders ha taken advantage of it to obtain some very singular results.

Another striking example may be found in the Devons. It matte what sort of cow be employed, the Devon bull invariably produces a re with a whiteish tuft to its tail. The Devon stock is the oldest and pur all the bovine race, and has acquired the mysterious power of reproduc itself more literally, in detail, than any other. It is now almost a recog fact among breeders, that, whichever animal of the two parents is the pure race will have the most influence in making the offspring; and it is understood by those versed in these matters, that for improvement we breed to a thorough-bred stock, on one side at least.

els bred upon half-breeds communicate most of the vices and infirmi-
ieir blooded ancestry and few of their virtues, and a second or third
generally loses all trace of the original good blood.
xemplification of this can be found nowhere more sharply defined than
ossing of the Caucasian with a lower type of humanity. The first
lts in a man inferior to the pure Caucasian, but superior to the
the Indian, or the negro, from whom he may have sprung. The sec-
is is with another mongrel, produces a being inferior to either race
it commingling with the same blood destroys all traces of the Cauca-
nent, and, in the case of the negro, at least leads to scrofula, impotence,
h.

has been from time to time much discussion among turf authorities
uestion as to which of the two breeding animals, the blood of both
ual, the sire or the dam, has the greater influence upon the organiza-
he foal. Able pens have defended both sides, and the question re-
mooted one.
henge, a noted authority on breeding, says:

e male and female each furnish their quota to the formation of the embryo it is rea-
expect that each shall be represented in it, which is found to be the case in nature;
e food of the embryo entirely depends upon the mother, it may be expected that the
he offspring and its constitutional powers will be more in accordance with her state
that of the father; yet, since the sire furnishes one half of the original germ, it is
sing that in externals and general character there is retained a *fac simile* to a certain
him."
influence of the male upon the embryo is partly dependent upon the fact that he
a portion of its substance in the shape of a sperm-cell, but also in great measure
effect exerted upon the nervous system of the mother by him. Hence, the preponder-
me or other of the parents will in great measure depend upon the greater or less
of nervous system in each. No general law is known by which this can be measured,
rthing known of the laws which regulate the temperament, bodily or mental power,
onformation of the resulting offspring."

ist be considered that outward circumstances and accidents may fur-
:eptional cases to all rules, where everything is equal between the two
; where they have the same purity of blood, the same degree of vital
he same general temperament, &c., the dam unquestionably furnishes
rnal organization, the blood, and viscera; and the sire gives the exter-
n and appearance. The stallion, however, in most cases, has more
wer and nervous strength than the mare, and exerts his individuality
an she at the moment of depositing the germ. For this reason colts
e their sires more frequently than their dams, where the parents "nick,"
lers say.
nick" is to reproduce their best qualities in the foal. This does not by
ns always happen, even where both animals are of the purest blood.
ebrated English stallion West Australian—a marvellous horse, winner
y and the St. Leger, of the same year—failed to nick with some of
mares in Great Britain. Only a few of his colts possess any of his
The same was the case with Priam, very few of whose colts from
American mares partook of all his excellence. Instances might be
ed *ad infinitum*.
traordinary case of nicking was that of Van Galen, in England, with
Tim Whiffler. This was his only successful nick for that year;
ont, Tim Whiffler, won nine times at three years old, and carried
han twenty thousand dollars and the Queen's vase at Ascot. The
kwell, on the contrary, was successful with a great number of
ag in the same year as many as thirty-two winning horses,
over one hundred and sixty thousand dollars for their propri-

A singular phenomenon, and one which should be much more widely known, is the lasting influence conferred upon the mare by her first stallion. The greatest care should be taken that the first horse that serves a fine mare is perfectly unexceptional in blood and breed, for all her colts thereafter are certain to resemble him in one way or another. Every one who has bred dogs knows that if the purest bitch in the world has her first litter by a mongrel cur, the purest dog of her own breed can never get a litter from her that will not contain at least one pup of mongrel character and appearance. A notable instance of this occurred in New Jersey some time since. A beautiful black and tan terrier bitch had her first litter by a mixed-blood dog with some Scotch terrier characteristics. Soon after her owner procured a thorough-bred black and tan for her, but all her subsequent litters contained pups bearing a marked resemblance to the Scotch breed.

Imagination is evidently a quality not confined to the "*genus homo*." All animals are gifted with it, and in individuals it is sometimes exhibited very prominently. May not the imagination of the female, be she canine, equine or whatever, be excited to the degree of producing practical results by the first male that approaches her thus, and any other subsequent similar circumstance of excitement bring back the recollection of her first love with force?

In the human race physiological phenomena of this sort are abundantly recorded. There are hundreds of instances where a widow, marrying a second time, has reproduced in her children extraordinary likenesses of her deceased husband; and of ladies who, having been thinking of their near relatives very anxiously, as in cases of dangerous illness, the chances of battle, or other troubles, have given birth to children precisely resembling the person thought of. This is exhibited most frequently in the resemblance of a child to its mother's parents.

The infant of two extremely plain and unprepossessing people who have other children as homely as themselves, has been known to come into the world possessed of great physical beauty, due simply to a beautiful portrait placed where the mother saw it every morning on awakening. In the same way all surrounding circumstances produce their results upon "the coming unborn," and the necessity for a tranquil, gentle, and undisturbed existence on the part of the mother should be held above all other considerations. There are too many horrible examples of the effect of alarm or anxiety, as shown in hideous deformities, like the "deer man," the "bear man," &c., who have been exhibited at various times by showmen, and in strange birth-marks resembling fruits or vegetables.

Thus much for the influence of imagination. The mysterious and delicate connexion between the mind, or soul and the body, is so abstruse and impalpable a subject that it baffles the researches of the acutest reason. By whatever process the offspring's physical organization may be affected, through mental condition of the parent, it is certain that it *is* affected, and no pains on this account can be too great.

In the breeding of animals, then, it seems strange that so little attention should have been paid by breeders generally in this country to the condition of their producing stock. Frequently, when an ordinary mare has a colt by a blood stallion, the owner is astonished to find it full of defects, when the first offspring of the mare may have been the get of a donkey. It is known that the zebra (an animal of peculiar individuality and temper, and therefore liable to produce a very decided impression upon the imaginative instincts of the female) marks with his stripes all the foals of any mare who has her first by him. In the south mares are set apart for the breeding of mules, and are never considered fit for anything else, and a good horse has been known to get a mulish looking colt simply from the effect upon the mare of the sight of a jackass.

The only method by which the highest type of the horse can be produced
to select animals of both sexes that have proved their qualities of blood and
upon the race course, and whose ancestors for certainly not less than
ve generations have also proved victors in severe contests. The breeding
be conducted under the most auspicious circumstances of time, place, age,
te, and assimilation, or there may be many failures, notwithstanding the
excellence of the parents; and assimilation is another subject to be
rely considered.

In the stock-raising regions of Texas, where the horse is permitted to have
wn way for the greater part of the year, and to continue the habits of his
ed ancestors, so far as his instincts may direct, each stallion is allowed a
un number of mares. He is grand Turk, and this is his harem. Free to
w these instincts, he keeps his mares entirely to himself. No other stal-
an approach one of them, and, when some hundreds of mares are turned
f a *corral* together, each seeks out her own stallion, and goes with him.
any in the bustle or confusion of the moment gets among the wrong party,
or in a strange *mañada*, her lord and master dashes into the crowd, seeks her
out, and drives her to his stamping ground; and in this untrammelled condition
the stallion strenuously objects to an incestuous cross. As soon as his fillies
reach the age of a year or eighteen months, he drives them from the *mañada*,
and, while he remembers them, will have nothing to do with them. The result
of such breeding would be fatal to the qualities of the very finest, purest blood,
rendering it scrofulous, and liable to all the diseases in the veterinary surgeon's
materia medica. No cross should ever be allowed nearer than a cousinship,
and the stallion in his native state recognizes this law. In brief, he associates
only with mares whose temperament and character assimilate with his own,
and the breed thus perpetuated improves with the increase of each year.

Dr. Harvey has stated that as the blood of the mother circulates in the veins
of the fœtus, passed in for its nutrition and development by process of absorp-
tion and assimilation, so the blood of the fœtus must in some degree commin-
gle with that in the mother's veins, forming a sort of general circulation.
Further, as the fœtal blood is in part the blood of the male parent, and pos-
sesses elements and characteristics derived from him, the mother is, so to speak,
inoculated with his blood and his peculiarities, which are, to use his own lan-
guage, "so engrafted in the system of the female as to be communicable by her
to any offspring she may subsequently have by other males."

McGillivray, the veterinary surgeon, declares that the pure bred female, in
becoming pregnant to a less pure male, is tainted *de facto*, and remains a cross
ever after, incapable of producing pure offspring.

These theories with that of imagination, before stated, cover the whole
ground, and fully account for the phenomena so often observed by all breeders
of thorough-breds producing mongrel foals. But Dr. Harvey's idea, if sound,
is full of import from another point of view. The more frequently two animals
ed together the oftener the blood of the male mingles with and assimilates
of the female. An equalization, a harmony exists between them, for
blood animates the pulses of both, and, therefore, an improvement
yearly in the produce of the horses of Texas. It is not impossible that
the reason why old married people who have had many children so often
to resemble each other strikingly. Breeding from one mare by different
is sometimes attended with success, but it should never be encouraged
ne first decided nick. The mare Cyprian had Joe Lovel, Songstress,
, and Cypriana, all by different stallions; yet it is probable that their
were due to the extraordinary vital and nervous power of their dam.
ner of Phryne played the wiser part in getting six celebrated racers
by one horse, Pantaloon. Four famous colts were got from Crucifix
hstone; and while the thorough-bred Glencoe and Dick Andrews

mares brought good foals from any good horse, (a truth powerfully shown by Pocahontas in England and Reel in the south,) they would doubtless breed better if confined to one stallion; and, under the same circumstances of treatment and health, each colt would be an improvement upon his predecessor. As a matter of course, the first foal should show that the blood of the stallion nicks with that of the mare.

The Texans have claimed that their native horse—the mustang—probably the degenerate descendant of the Spanish barb, spoiled by the errors of the Mexicans and the absence of a test like the race course, was better suited to that region than our best stock. Common horses of mixed blood, taken there during the war with Mexico, failed to become acclimated, and shortly after their arrival died of Spanish fever or some other disease. The experiment of taking thorough-breds to Texas was afterwards tried and with the happi results. As a matter of course, they took the disease of the country, but in a mild form, and all recovered; and thereafter proved infinitely superior to any mustang for vigor, speed, and endurance, being able to travel one-third further *per diem* and with less fatigue. This in a country where riding on horseback is the only means of prosecuting a journey, and all horses are used to the saddle

This result goes strongly to prove the superior physical superiority of the purely bred animal. His blood is free from hereditary taint, and his pulse perceptibly quicker than that of the common horse; qualities which render h less liable to contract disease, and better capable of throwing it off when con tracted. His singular elasticity of temperament as well as of bodily construc tion enable him when once acclimated to vanquish without effort the mustan upon his native soil. An erroneous idea concerning the thorough-bred prevail that, being delicate and slender in appearance, his legs are not so strong those of the heavy farm horse or roadster. This is an egregious error. T English farmers, desirous of improving and converting their horses into show hacks, have bred common animals with weedy blood stallions, discarded fro the turf on account of weakness in the legs. These weeds have reproduc their infirmities in their foals—as the well-known Cobweb, for example, tran mitted a tendency to navicular disease to all her colts—while their virtues ha been swallowed up by the gross blood of the mare. Thus blood stock fe into disfavor for practical service in breeding road horses, but, happily, t error is being dispelled, and the more enterprising farmers are seeking to i prove their stables by the use of as many scions of ancient lineage as they c procure. The legs of the thorough-bred, indeed, are a marvel of mechanic strength. Fancy a body weighing from nine hundred to eleven hundr pounds flying through the air at the rate of thirty-five miles an hour, a striking the ground at rapid strides of from twenty-two to twenty-seven feet length! Can any one imagine that this may be done without great strength limb? Suppose a locomotive engine, ever so strongly built, of the same weigh going at the same speed, could be made to progress by leaps of twenty thirty feet, how long would either rail or engine last? Hardly so long a thorough-bred racer. The best trotting horses—the highest type of the mo grel—get lame during the trotting season without one-half such trials as t racers undergo; and were it not for the dash of choice blood that flows in the veins, it would be found, after a trot, that literally and metaphorically "th had not a leg to stand upon." The reason why heavy farm horses do not g lame so often as racers and hunters is because they do nothing to make the lame. Their weight is their great virtue. All they do is to lean forward the collar and draw by sheer dead weight. Put them to the test the rac must undergo and their legs would soon be sorry spectacles. "An ounce blood is worth a pound of bone." Nor can they carry so heavy a weight the racers. Fair Nell, the Irish mare that first beat the Arabians on sand, was accustomed to hunting with a rider of two hundred pounds

s has demonstrated that the blood horse will stand
ngrel animal can bear. This is probably the result
oubt, but also of superior strength. It is a note-
of the thorough-bred are of the finest possible tex-
more than those of the mongrel cart-horse, though
of the latter are honey-combed in structure, while
d, closed-grained, and almost like ivory.
twenty-two to twenty-five hundred blood horses are
ally remarkable ones are exceedingly rare. Four or
nay be considered the annual maximum; and the
row first-class colts possessing the qualities of the
appearing in three or four years; this with all the
; that the turf can give in a country where it is a
patronized institution. What, then, would be the
discontinued? None could know which sires and
he fastest foals. Animals with like infirmities would
infirm colts thus produced would be in-bred again
nd horses left to breed from, and a mongrel sort of
lace of the noble animals that now flash down the
of the sovereign and the pride of the nation. How
such a famous stallion as Glencoe would have added
ares to the stock of America, had it not been for the
have foreseen that Lexington would have given an
Thunder? Who could have divined that Stock-
such colts as St. Albans and Kettledrum; or, that
arse, common-looking stallion, would produce foals
best racer of fifty years—Blink Bonny, and Thor-
e—of whom all the connoisseurs cried, on seeing him
he's a butcher's hack"—would turn out the greatest

e of the race, as a test of purity of blood and breed,
e race itself may be abused in the case of mares des-
. It has been observed that many of the best racing
ing from the course they had honored by scores of
reproduce their brilliant qualities in their offspring.
vitality had been expended in the labor of training
race. Breeders should make a note of this truth, in
choose those whose exploits are few but wonderful,
ve not been impaired by age and over-exertion, rather
f a hundred prizes. The melancholy example of
n, Peytona, and hosts of others, should be a warning
mare can be run until she is entirely exhausted and
o breeding. Like all other rules this has its excep-

g error among breeders is, that after having brought
egree of purity, it is no longer necessary to employ
They seem to imagine that their three-quarters or
s, breeding together, will get thorough-bred foals.
lattoes or quadroons, intermarrying continually, pro-
fact is, that constant infusions of the purest blood
improve all stock, human and equine, but to keep it
ervice of a thorough-bred cannot be dispensed with
legeneration must surely follow. If we arrive at a
e for saddle horses for cavalry and other uses, it will
ed solely from them. The "saug pur" must be im-
to keep the race from deterioration, and so improve

it as much as possible. Such is the recent wise decision of the agricultura societies of Great Britain, founded upon thorough research and careful analyza tion of all the facts possible to be obtained. From these remarks it must not be understood that breeders who wish to improve their horses can do so by picking the worn-out, weedy, cast-offs of any and every racing stable. Some writers seem to fancy, when the thorough-bred stallion is recommended as a means of purifying the blood of American horses, that all thorough-breds are alike for that purpose. This is simply absurd. When speaking of the cart-horse, it is by no means meant the rack of bones that staggers in front of the ragman's cart; and when of the blood stallion, it is meant one which has not failed to stand the most vigorous test. If our stables are to be replenished by the descendants of English racers, the most successful of them should be selected. To produce the thorough-bred, all circumstances of feeding, stabling, grooming, and general care must tend to encourage the qualities that make the great racer a type of his genus. The real thorough-bred is an animal which shall stand the test of training and racing successfully, and can reproduce himself or a better. This is the horse we want, and it is simply hypercriticism to say that the present running horse is not thorough-bred because his remote ancestors may have been a mixture of the Arabian, the Barb, and the Turk. Six to eight generations of racers that can fulfil these obligations will result in as perfect a specimen of the horse as can be desired or procured. The vital importance of breeding from the finest proven thorough-bred animals must now be clearly seen, yet, after the care and trouble of procuring the true foal, genuine and unblemished, we have accomplished little if we do not know how to raise him in a manner worthy of his high pedigree and mission. It is the easiest matter in the world to spoil good colts by careless or ignorant treatment.

Take, for instance, two Durham calves from cows of equal purity, and sired by the same bull. Send one into "green fields and pasture new," stable it in cold weather, and give it all it can need for its health and comfort. Turn the other out to pick its living on a bleak and rocky barren, to shiver with cold, and to search wearily for the few blades of sickly grass that grow in granite clefts. Then at the end of the year compare them. The first will be a fine, sturdy, handsome fellow, sleek, bright, erect of head, straight of limb, courageous and intelligent; the other, a miserable, melancholy runt, without pluck or beauty, lean, small, and showing scarcely a trace of blood. Take two more calves of the same parentage, and turn the fat one's brother out upon the hills, and the lean one's brother into the rich pasturage and warm stables; feed them precisely as their relatives were fed before, and it will be found that the brothers look nothing alike, while those of different parentage look like brothers. Now, try to fatten them all alike. The two that were well treated will thrive, but the others, though they may improve, will never attain their proper size, or be anything but runts; nor will they be fit for breeding purposes, comparatively, as it is in nowise different with the horse.

A great deal of the stamina and ability of the growing foal must be taken into his system through the stomach. As beef and mutton are the most strengthening food of man, so oats hold the same prominent place with the horse. He must be fed high at an early age if he is to run fast and endure. As soon as he can eat he should be fed liberally upon a gruel made of ground oats and cow's milk; as he gets older, unground oats without milk should be given him, not in his mother's feed-box, but in a separate one for himself. In summer, while he must be permitted to run at large every night, to roll, to run, and eat fresh grass, he should be stabled during the day from 10 a. m. to 5 p. m., on account of flies and heat, and his diet of oats must not be suspended on account of his having grass. Of late years, the best trainers have become so profoundly impressed with this necessity for generous feeding, that they object to receive any horses into their training stables which have been raised in the ordinary

way, with grass and barn-yard care. They assert that the mischief is already done, and that it is useless to attempt the training of an animal that has not been oat-fed almost from birth. But this high feeding will require close care. Its tendency is to make bone rapidly, and unless the system is kept clear of impurities, and the secretory glands are strengthened by compulsory exercise, this rapid formation of the bony element may clog the secretions and produce ring-bone, or some kindred complaint. The English method is to work their two-year-olds rather too severely. That age is not sufficient to bear the labor of racing. The colt may be gently exercised, say for two hours a day; one in the morning, and one in the evening. It may be said, however, that the English colt is as mature at two years old, as ours at two and a half, probably on account of the advantages of heavier oats, more succulent hay, and a less varied climate, for it must be known that climate affects all animals very considerably. No better illustration of the fact can be given than that of the English bull-dog, the most savage, vindictive, ill-tempered of all dogs when at home, but which becomes transformed by a residence in Italy to quite a reasonable creature. A few generations bred in Italy suffice to bring forth pups without a trace of the original bull-dog character, save in external formation and appearance. And in this country our organization, derived from our English ancestry, is perpetually at war with the polar frigidity of our winters, and the torrid heat of our summers. There are those who eulogize the climate, but we have sadly lost the erect frames, the red and white complexions, and the sturdy air that belong to the colonists, and are still preserved by our English cousins.

And, now, to sum up: for a long time it will be necessary to breed and raise horses, especially for the use of cavalry—horses that can go well, carrying not less than two hundred and twenty pounds—the average weight of the trooper with his equipments. This requires a horse of sixteen hands, (five feet four inches,) weighing from one thousand to twelve hundred pounds. He must be strong-backed, sound in the limbs, and with plenty of bone and sinew. His withers must be high and oblique, so as to carry the saddle naturally, and he must have the temper and courage of the thorough-bred. The courage of the trooper depends much upon that of the horse. Brood mares, to produce such stock, should be put, between the ages of five and fifteen, to thorough-bred, well-tried stallions. The colt should be brought to eat oats as soon as possible, and should have two quarts a day until weaned; after that four quarts should be his allowance, with grass and hay in their seasons. This gives good size; and, at the end of two years, he may be broken to advantage, both to saddle and harness, and the cavalry drill may commence.

To procure stallions capable of producing such offspring, it is imperatively necessary that the running race should become a regular institution, and this requires the patronage and authority of the government.

To make good cavalry horses, then, the first necessities will be a bounty given by government to racing stallions; liberal appropriation to every club of a hundred gentlemen who will contribute a certain fixed sum, the whole to be given in purses for the promotion and encouragement of the running race; and the introduction and raising of thorough-breds. There might be, too, a discriminating tax in favor of thorough-breds laid on the receipts of all stallions not for service; and, furthermore, an annual tax upon vehicles of every description, save those used strictly for business purposes. This will tend to bring into the saddle those who now take the air only in pleasure wagons, and give a real interest in the production of horses for the saddle alone.

There should also be an annual agricultural exhibition in each one of the States, when a government premium should be awarded to the best thorough-bred stallion of a fixed standard—the winner not to be allowed to compete for the premium.

The government should be ready to purchase colts of a given excellence and size, at a given price, for the cavalry service; not the price of the present day, for a vastly better animal is needed before our cavalry can be worthy of the name. The English mounted regiments have a certain sum appropriated them annually for horses. The colonels expend this sum in yearling thorough-breds, which are immediately put out to be raised expressly for the service. This is, perhaps, expensive, but so are all military operations; and one result of the generous English plan was that the six hundred of the Light Brigade charged straight through five thousand Russians, and some of them lived to return, hewing their gory way back again. The English cavalry horse of the very best type is precisely the same as the English hunter, and his improvement may be judged from the fact that, while a hundred years ago it was not uncommon to run a fox from daylight until dark, and then, unearthing him next morning, to run him all that day. In these times the run never lasts more than four hours, and in general only an hour or two. The fox has remained the same, or, if anything, has become more wily, while the horse and the hound, by training and testing, have vastly improved upon their former degree of excellence.

It may be thought that England has received a somewhat extravagant amount of credit in the course of these remarks. She deserves it, and it is better to tell the truth and follow its teachings than to garble facts in favor of a false and selfish idea of patriotism. In giving her saddle horses the first place of honor, we only do what France, Austria, Prussia, and Russia have done in purchasing them for their cavalry, and what American turfmen have done in acknowledging decisive defeat of some of our best horses when fairly tried against those of England.

The portraits which accompany this paper are those of *Slasher* and *Ten Broeck's Eclipse*. The former an American bred horse by Childe Harold, out of Sarah Washington.

PEDIGREE OF SLASHER.

Slasher is a bay, 16¼ hands, foaled 1854, by Childe Harold, by Imported Sovereign by Emilius, out of Sarah Washington, the celebrated dam of Inspector, Sue Washington, Fanny Washington, Bonita, &c., &c. Slasher's numerous races, at every distance, but especially his four-mile victories at Ashland, Petersburg, and New York, are too recent to require more mention.

The dam of Slasher, Sarah Washington, has been very remarkable for the production of very superior colts. She brought nothing but celebrated racers, with one exception, when the foal was injured by a fall while very young.

Arguing from the facts and principles laid down in the foregoing article, we may conclude with all safety that Slasher, with such a pedigree, must possess in an eminent degree the power of nicking and reproducing his own best qualities in his offspring. So far his colts give every evidence of verifying this conclusion, although none of them have as yet made a debut upon the turf. In appearance Slasher, as may be seen, is a handsome horse; color bright bay, black mane, tail, and legs, and stands sixteen hands high. As a racer he was a winner at all distances against the best horses of the day. He is a good trotter, and might to the superficial observer pass for a coach-horse of the highest type.

PEDIGREE OF ECLIPSE.

Eclipse, imported to this country by Mr. Ten Broeck, is a dark bay, 16¼ hands, foaled 1856, by Orlando, out of Gaze by Bay Middleton. He was imported from England after winning the Clearwell stakes, the stakes at

Plate XXIII.

ECLIPSE.

Imported Stallion, owned by Francis Morris, Esq., New York.

few Market Craven, the biennial stakes at Ascot, and other races; beating Boland, the winner of the 2,000 guineas stakes, and Sunbeam, the winner the Doncaster St. Leger, and running a dead heat in the New Market with Beadsman, the winner of the Derby. By his performances and pedigree, Eclipse was considered the best colt of his age in England. His sire, Orlando, was one of the fastest horses of the century; and his grandsire, Touchstone, has to this day produced the greatest number of winners. The sire weighs 1,150, and his colts already in training show the speed, size, and bone of their sire.

Like Slasher, Eclipse has no colts yet upon the race course, but they are as highly prized by their owners as any in the country, and give abundant promise for the future, having exhibited as two-year-olds on their first training a creditable degree of speed and mettle.

Eclipse stands sixteen hands in height; is of a rich chestnut color, and in form and appearance is the highest type of the thorough-bred English racer. His best performance in England was running a dead heat for the "two thousand guineas stakes" with *Beadsman*, the winner of the Derby the week following.

A. J. Miner, who brought so many of Mr. Ten Broeck's horses, English and American, successfully to the post, considered Eclipse as probably the best horse he ever saw. For many of the facts and suggestions in this article we are indebted to "Wilkes's Spirit of the Times."

THE CONESTOGA HORSE.

BY HON. JOHN STROHM, NEW PROVIDENCE, PENNSYLVANIA.

The wide celebrity acquired by this distinguished animal has induced a belief that he springs from some peculiar species or breed of that genus of quadrupeds whose services contribute so largely to the comfort and prosperity of man, especially in an agricultural community, and has inspired a desire to know something about the origin, comparative merits, and system of breeding, of a class of horses whose fame is commensurate with a large portion of the United States.

Deeply impressed with the belief that the superior excellence attributed to the Conestoga horse is not derived from any strain or breed that can now be traced as to its origin, the following sketch has been penned with the view of exploding error, and at the same time to rescue the history of that celebrated animal from that oblivion to which modern inventions and recent innovations are rapidly consigning it.

The name of "Conestoga" is derived from a river (to which the aboriginal inhabitants had given that name) that rises in the northeast part of the county of Lancaster, one of the southeastern counties of the State of Pennsylvania, flows through the central part of said county, in a southwesterly direction, and empties into the Susquehanna at a place now called "Safe Harbor," where extensive iron works have been established. This river rises in and flows through a region of country of unsurpassed fertility, where cereal grains and tame grasses are grown to an extent unrivalled in any part of the

The settlement of this valley commenced in the early part of th
tury. The first European settlers emigrated mainly from Switzerla
adjoining parts of Germany, interspersed with French Huguenots, w
in this new country a refuge from the persecution which oppresse
their native land. They were principally agriculturists, and, from n
well as choice, devoted their attention to the same vocation in their

Their first care was to clear the ground of the heavy growth of ti
extended over the whole region; for here were no prairies covered
grasses, furnishing abundant nourishment for stock without labor an
price, and requiring but little cultivation to produce the grain that con
principal sustenance of man, and the domestic animals subservient t
fort, convenience, and pleasure. The laborious task of clearing
forest was mainly effected by the use of the axe and the action of
huge logs were collected together in piles, the interstices filled with the
when the application of a torch soon reduced the whole mass to ash
served to ameliorate and fertilize the soil. The next object was to
the ground, and prepare it for the reception of the seed, from which
dant harvest was anticipated.

In the accomplishment of this, the horse was found a useful and c
if not indispensable, assistant, for without the aid of this useful anim
tivation of the soil must have been very limited. The horses used
early settlers were no doubt the progenitors of the far-famed "
horse," which in after times became so extensively known and spoke
of what particular stock or strain they were, or whence they came, hi
tradition are equally silent, or afford no reliable information.

As Chester county and the vicinity of Philadelphia were partial
and considerably improved before any settlement was effected in the
valley, it is quite probable that the first immigrants to this valley de
first stock of horses from their nearest neighbors inhabiting the abo
localities; and it requires no great stretch of imagination to suppose
first settlers of Pennsylvania who came here with William Penn, o
their immediate successors, brought some of those useful animals
from England, from which the whole stock of horses in the country a
were derived. But it was not only in the cultivation of the soil that
was so essential to the immigrants to this (then new) country. Th
then no flouring mills in the county of Lancaster, the inhabitants
pelled to carry their grain to the Brandywine mills, near Wilmingt
State of Delaware, some forty miles distant, to be manufactured int
family use.

This was a laborious task, that could hardly have been executed w
aid of the useful animal that forms the subject of this essay. These
services were fully appreciated by those honest and industrious set
the horse, who was a companion of their toil, and so essentially ne
their success and prosperity, became to them an object of great att
(I had almost said) affection. Just, humane, and generous, this ra
treated this trusty and faithful domestic with a degree of considerati
bestowed upon any of the brute creation. Their superior intelligence
them from that ardent affection, approaching to adoration, which the
of the desert is said to entertain for his courser; and, though the hor
an inmate of the same apartment that sheltered his wife and childr
are told is sometimes the case with the Bedouin Arab, he was prov
comfortable quarters, at no great distance from his master, and partc
ously of the cereal grain and nutritious grasses which his own str
labor contributed so materially to produce.

Being thus well fed, protected from the cold and inclemency of th
when not actually in service, and never overworked or abused, this ho

15 A

is treatment, attained to the full development of his natural powers, and
d at a degree of beauty and perfection seldom found in any other country,
ch surpassing the original stock. The deep interest with which the far-
or this region regarded this noble animal, naturally stimulated a desire to
e the stock and to bring him to a still greater degree of perfection.
ns was not attempted by any scientific system of breeding; for this frugal
e, always having an eye to economy and utility, kept neither males nor
for the exclusive purpose of breeding. Sometimes a stud horse was
nved from labor during the two last months of spring and the first of
e summer season; but at the expiration of that term he was put to the har-
ss again and compelled to do his share of the labor which the interest of his
prietor required. So with the mare; she was generally worked until within
ew weeks of foaling; and instances are not unfrequent where they have
kept in the harness until the time of parturition. This, however, was
done through ignorance or misapprehension of the time when the foal is
ted. In about a week after the mare has foaled, she is again put to the
ss and performs her ordinary share of labor on the farm.

The colt is permitted to run with its dam until it is about three months old;
is then weaned and turned to pasture, generally receiving a little oats once
twice a day for a month or longer. Judicious farmers advise the feeding of
l quantity of oats daily during the first winter; but colts frequently, if
generally, have to be content with a warm stall and plenty of good hay.
he second winter they require no grain, and, unless regularly and very
igly fed, are considered better without it.

At about two and a half years old they are usually "bridle broken," and
lightly worked for a while in the autumn; but during the ensuing
they are commonly suffered to run idle, being seldom regularly worked
l fully three years old.

Under this system of breeding, by selecting their best stock for the purpose,
e farmers of the Conestoga valley were very successful in improving their
ck. As the country was brought under cultivation, and the dense forest
s succeeded by fertile fields of waving grain and rich pastures of succulent
sses, roads were opened and facilities afforded for transporting the surplus
ductions of the farm to the sea-board. Wagons were now introduced, (for
roads and canals were not then in vogue,) and the strength and fidelity of
horse were relied upon to drag those heavy-laden wagons to their destined
ces.

In the performance of those services it will readily be perceived that
ength and activity were the most essential requisites. To these points, then,
attention of the sagacious farmer was constantly directed in the improve-
of this indispensable quadruped—their aim being to produce a strong,
vy, well-set, and tolerably active animal, with great powers of endurance.

The immigration to and settling of the western States created a demand for
portation of large quantities of dry goods and groceries to supply the
of those engaged in opening up and settling those new countries; and
of the farmers in the Conestoga valley occasionally employed their teams
ng "store goods" from Philadelphia to Pittsburg, the latter place being
erminus beyond which eastern teams seldom went.

the war of 1812 these noble teams rendered essential service to the
y ... the transportation of arms, ammunition, and supplies to the army
frontier. Long lines of those teams were frequently seen wending their
way to the theatre of action, and contributing greatly to the comfort of
and the defence of the country. Their usual route of travel was from
e ia through Lancaster, crossing the Susquehanna at Columbia or
, and thence over the mountains to Pittsburg, and sometimes north-
Lake Erie. This was before the construction of turnpikes and canals,

and the capacious wagons which the Conestoga farmers then had in use the heavy teams of large, fat, sleek horses attached thereto, were the means of transportation which the times and circumstances of the country afforded. These wagons and teams attracted attention and commanded ration wherever they appeared; and hence the origin, as I conceive, horse and wagon to which the appellation of "Conestoga" has been atta The farmers of those days seemed fully to appreciate the importance of teams, and evinced considerable taste and no little pride in their style of them out. The harness was constructed of the best materials, with an show as well as utility. In the harness and trimmings of these teams frequently indulged in expenses that approached to extravagance. In ad to what was indispensably necessary, articles that by some were deemed decorations were sometimes appended, and served to increase the admi which the noble animals to which they were attached so universally attr It was, indeed, an animating sight to see five or six highly fed horses covered with heavy bear-skins, or decorated with gaudily fringed hou surmounted with a set of finely toned bells, their bridles adorned with of red trimming, and moving over the ground with a brisk elastic step, ing disdainfully at surrounding objects, as if half conscious of their su appearance, and participating in the pride that swelled the bosom of thei ter and driver.

The Conestoga horse, then, though his origin cannot be traced to an tinct species or breed, though his pedigree is not recorded in any stud or his exploits blazoned forth on the pages of a turf-register, is still myth—not the creature of a fervid imagination or a disordered fancy— veritable, strong, active animal, pre-eminently useful in his day and gene brought to perfection by judicious breeding, kind treatment, and carefu agement; and the term Conestoga is used as denoting superiority in the cl draught horses.

Subsequent to the period above referred to, as the improvements country advanced, and the population became dense and prosperous, a of enterprise was fostered and excited that culminated at that time in th struction of a continuous line of turnpike road from the city of Philad on the eastern margin of the State of Pennsylvania, to the city of Pitt near the western border of the same State. This great improvemen structed to facilitate the constant and rapidly increasing trade to the w States, introduced innovations that imposed new and additional duties c useful quadruped which forms the subject of this essay. A line of coaches was established, running between the above-named cities, brought into requisition a class of horses widely different from those abo scribed. A lighter animal, combining strength with more agility, was re for the transportation of passengers and forwarding the mail, which, in quence of the vast increase of business, had become an object of public tude. These innovations directed the attention of the Conestoga farm well as of all others engaged in the breeding of horses, to the peculiar qu of the English race horse, whose slender form and tapering limbs seeme calculated for light and active employment. Stallions were importe England, and by a crossing of those with the native breed of the coun rather with the stock then existing in the country, an animal better su the exigency of the times was produced; while at the same time the draught horses to transport the weightier and more cumbersome articles c merce were constantly in demand. At a later period in the history of ou try, when the construction of railroads and canals subserved the purp transportation both of passengers and freight, the services of the class mals hereinbefore described were to a great extent dispensed with; long neys with heavy teams were no longer necessary, and less pains were ta propagate a class of horses for which there was no pressing demand.

As new States of the west became settled and cultivated, the western drove large numbers of horses and mules to the eastern part of Penn- a considerable portion of which were purchased by the farmers of La er county; the former, as being better suited to the business of the while the latter were well calculated for heavy draught and endurance of at less expense of feed and provender than the horses formerly used, less liable to disease, and capable of sustaining labor at a much greater y have in a great measure superseded horses; and, at the present time, a western horse finds a readier market even on the banks of the Conestoga one that has been raised in the immediate vicinity.

The construction of railroads, locomotives, steam engines, and telegraph communications has infused a spirit of activity and energy into all business circles. Numerous light vehicles are now daily used on our common roads in the ordinary transaction of business, as well as for the purpose of travelling and the interchange of friendly visits betwixt neighbors and relations; and "Young America" can no longer endure the slow, steady, but sure and regular gait of the "Conestoga horse." A "two-forty" nag is more highly valued and seems more in keeping with the rapidity with which business of all kinds is driven at the present day. Notwithstanding, there are still a great many fine teams in the Conestoga valley, and in despite of youthful opinions and modern innovations, many of the old-fashioned farmers cling to the use of the faithful horse that has so long been the boast and the pride of Lancaster county; and on occasions of public demonstration, such as cattle shows, fairs, political conventions, &c., these teams may be seen parading the streets of Lancaster city under the merry jingle of their well-chimed bells, and champing their bits with all the pride and fervor of days of yore.

From the preceding considerations, I come to the conclusion that the Conestoga horse is not a distinct species or strain of that noble quadruped, but belongs to a class that has attained a great degree of efficiency for a particular purpose; and that the appellation by which this class is so widely known denotes superior excellence in the class of draught horses, although the individuals composing it may have sprung from a crossing or mixture of various breeds or families into which the horse family is at present divided.

There is, however, one distinguishing characteristic in the history of this animal that has been but slightly adverted to, which deserves, perhaps, a more extended notice; and that is the high condition in which the animal is usually kept in the region of country from which he derives his name and his fame.

The farmers of the Conestoga valley, (which includes so large a portion of the county of Lancaster as to be almost synonymous with it,) as a general rule, are in the habit of feeding more grain to their horses and keeping them in higher condition than those of any other section of country known to the r of this article. Indeed, the keeping of very fat horses has become a with them. This passion, stimulated by pride, as is frequently the a tendency to deteriorate rather than improve the animal; for being ed with an unnatural load of flesh and fat, the horse becomes slug- unwieldy, and incapable of undergoing or enduring the same amount of t he might otherwise do. This morbid condition of the system ren- ne animal more liable to disease, and in various ways detracts from his and impairs his usefulness.

in this as in other things "passion rules the hour," and the individual ts or refuses to keep his horses plump, sleek, and fat, is deemed and thriftless, or exceedingly penurious, loses cast with his compeers, an object of ridicule and contempt. I do not mean to intimate every fat horse is a Conestoga horse; but I never knew that flattering be plied to a lean, gaunt, half-starved-looking animal, whatever his points, or other qualifications may have been; and hence we fre-

quently hear such expressions as "broad as a Conestoga horse," "fat as a Conestoga horse," "has a neck (or breast) like a Conestoga stallion," used either in compliment, irony, or derision, according to the humor or design of the speaker.

I cannot close without expressing regret that the "Conestoga horse," whose name for so many years has been suggestive of strength, usefulness, and beauty is likely in a few years more—from disease and neglect in breeding—to become quite extinct as a breed of American horses.

The horse from which the illustration for this article is taken is owned by Calvin Eshelman, of Martic township, Lancaster county, Pennsylvania, and will be three years old next July, is 16 hands high, and weighs 1,350 pounds His color is black, and he is a very good specimen of the Conestoga horse.

MULE RAISING.

BY J. T. WARDER, SPRINGFIELD, OHIO.

A PAPER upon the production of so useful a domestic animal as the mule would not be considered complete without some allusion being made, at the outset, to the origin and parentage of this hybrid. Though everybody is supposed to be acquainted with the facts of mule breeding, we yet find a great many persons who do not know the precise meaning of the terms employed. A mule, in scientific language, means the progeny from a cross between two distinct species, either of animals or of plants, which species, however, must be very nearly related, or they will not intermingle. This progeny is generally infertile or barren, though there are some exceptions to this observation in the first generation of hybrids. In the case of the horse-mule there appear to be but few instances recorded of fruitful intercourse, and none beyond the first generation, though in the case of plants, where, perhaps, the species were less distinctly marked, few seeds will germinate, and few are perfected after two or three reproductions from the first cross. Indeed, this production of mule hybrids next to the non-production of any progeny, as the result of attempts at crossing distinct animals and plants, has been assumed by naturalists to be conclusive evidence of the existence of distinct species.

In the practical language of the farm and of the market the word *mule* has come to mean the progeny of the male ass, or jack, upon the female horse, or mare, while the word hinny is applied to the product of the reverse cross of the stallion upon the jenny, or female ass. In these two different hybrids, containing a similar admixture of blood, we find a most remarkable difference of character, which cannot be explained philosophically, but which is often cited as showing the relative impress of dam and sire upon their progeny. In the mule we find the general characteristics, such as the head, ears, voice, tail, feet and temper, are asinine, and the males are two or three times as numerous as the females, while in size the progeny more nearly resembles the dam; but in the hinny, or progeny of the stallion on the jenny, the qualities of the horse predominate, with diminished size, this latter quality appearing to depend upon the female.

There is a common impression that the mare which has once been covered by a jack will never again produce a good horse colt, and that she should be

WM. INDEN-SMITH

e breeding exclusively. This would make it appear that the male an influence upon the female that is not confined to her immediate , but is transmitted through her to her future offspring. This prin- is admitted as established by some physiologists, and the following inci- is often cited in proof of the position: A mare that had been covered by a, or zebra, and produced a striped mule from that cross, afterward had at were begotten by three different stallions; each of these horse foals ped, and resembled the quagga in other respects. The same is said to result after breeding a mare to the jackass. The authority for the above not given, but it is generally admitted to be correct. Mr. Lyell tells us that y be laid down as a general rule, admitting of very few exceptions among upeds, that the hybrid progeny is sterile; and there seems to be no well- ticated examples of the continuance of the mule race beyond one gen- n. The principal number of observations and experiments relate to the d offspring of the horse and ass, and in this case it is well established that e he mule can generate, and that the she mule can produce. Such cases ur in Spain and Italy, and much more frequently in the West Indies and New Holland; but the mules have never bred in cold climates, seldom in rm regions, and still more rarely in temperate countries.

We learn from Wilson's Rural Encyclopedia that no impediment to propa- on has been observed by anatomists or physiologists; and the incapacity of creatures, in all ordinary circumstances, to become parents, must arise m ie subtle property of the vital power, or some anomalous working of e organic functions, or some derangement in the peculiar or proper forces of a consequent upon the monstrousness of their origin. Every mule is a mp d of two species, and seems to be to a certain extent a malformation n, and a type of neither; and while unable to reproduce the specific form is dam or of his sire, he is wanting in a sufficient specific character of his n to be the proper subject of reproduction. Nor do mules exhibit a true of the specific properties of their parents; but as regards the most im- rtant properties, such as size, form, constitution, temper, and habits, they lly possess a closer resemblance to their dam than to their sire. Buffon rs, in the case both of mules and hinnies, "that they retain more of the dam n of the sire, not only in magnitude, but in the figure of the body; whereas the form of the head, limbs, and tail they bear a greater resemblance to the e." The same naturalist infers, from various experiments respecting cross- eds between the he goat and ewe, the dog and the wolf, the Canary bird l the goldfinch, that the male transmits his sex to the greatest number, l that the preponderance of males over females exceeds that which prevails the parents are of the same species. Any two species of the equine will hybridize with each other, but some do so with facility and willing- and others with difficulty and repugnance. Mules have been generated n m the horse and the quagga. They are readily produced between the and the ass, as is well known; but they are very reluctantly and sparingly ced between the ass and the quagga. In an experiment related by Pen- a he ass and a she zebra were for some time unsuccessfully kept together a view of their hybridizing; but after the ass was taken aside and painted a manner as to resemble a zebra, and conducted back to his companion, u d and produced a mule; another ass and zebra mule was produced a, but it died as soon as it was born; and another, a well-formed female was produced in a menagerie at Paris, from a Spanish ass of the largest a female zebra, and became larger than its dam, acquiring a form some- lar to that of its sire, and was remarkable for docility. In another a female zebra was covered by a stallion and became pregnant, but e eighth month of her gestation, and when her body was opened the found to be a male without hair, and marked on the head with black

and white stripes. The same authority, after referring to the similarity name in different languages of the true mule, produced by the jack crosse the mare, tells us that "the mule has considerably more resemblance horse than to the ass, and often, in the south of Europe, is a very fine of from fifteen to seventeen hands high. Its head has generally a clums and a heavy appearance, and is the most exceptional part of the whole sy

These animals are considered by naturalists to be distinct, but nearly species. According to the latest authorities they are members of two g though formerly the horse and the ass were both included under one. scientific name of the horse is *Equus caballus;* of the donkey, *Asinus vu* and the zebra, or quagga, is called *Asinus zebra* by Baird. In every c the mule is sure-footed and hardy. In Spain it has the finest form a pearance; in Savoy it has a remarkably large size; in Egypt it is abou in value to a medium horse; and in the mountain regions of large port both Europe and South America it is far more serviceable than the hors be, and completely supersedes it.

The mule is everywhere hardier than the horse, subject to fewer di more patient, better adapted to travelling on rugged and trackless surfac fastidious as to its food, and much less expensive in feeding, more musc proportion to its weight, and usually living and working to about dou age. A troop of mules, freighted with their burdens and travelling am passes of the Andes, is said to be a very picturesque sight. If the can styled "ships of the desert" when traversing those trackless plains, th mules are equally important in the narrow defiles, and on the rocky le the elevated mountain regions of the world. Darwin, speaking of the n South America, says, "Each animal carries on a level road a cargo w four hundred and sixteen pounds, but in a mountainous country one h pounds less; yet with what delicate slim limbs, without any proportiona of muscle, these animals support so great a burden! The mule always s to me a most surprising creature. That a hybrid should possess more gence, memory, obstinacy, social affection, and power of muscular en than either of its parents, seems to indicate that art has outmastered n The same authority informs us that "an old steady mare, with a lit around her neck, acts as a *madrina* or god-mother to the troop upon the neys, and wheresoever she goes, the mules, like good children, follow h several large troops are turned into one field to graze for the night, morning the muleteer has only to lead his madrina a little apart and tin bell, and although there may be 200 or 500 mules together, each imm knows its own bell, and separates itself from the rest to join its own tro

"The affection of these creatures for their madrina saves infinite troubl nearly impossible to lose an old mule, for, if detached for several h force, she will track out her companions, or rather the madrina. It i well-established fact that these creatures will follow any animal that w bell, and drovers take advantage of this trait in their character in movi from place to place, as is well known to every one who has had anythi with their use." Though so wonderfully adapted as pack beasts for th portation of merchandise over difficult roads, in precipitous mountain pas are impracticable for horses, these valuable animals are also admirably s other uses to which they have been applied. In southern countries part they are used for light transportation almost exclusively, and even the g use them for their carriages as well as under the saddle. In our own the prejudice that once existed against them is rapidly yielding, and them used in the street cars in some of our cities, and occasionally obser attached to elegant private carriages. In many parts of the country used for heavy draught; for this purpose they have long been empl some of the iron regions, which are often hilly, and even mount

with very bad roads—rough, rocky, and muddy—where these animals to be better adapted to the circumstances than horses. In some of ntainous portions of Pennsylvania they are used in the log-wagons, and ruly marvellous to see them tugging at their loads, drawing the wains d huge rocks, logs, and stumps, and through rapid torrents, and among of tangled underbrush that would appal a team of horses, and where atter animals would be entirely worthless. It is true the teams employed n situations are of superior quality, and are much larger and heavier than n mules; but their powers of endurance and their determined pluck and rerance in overcoming difficulties make them invaluable in this kind of ice. Then, again, their great intelligence adds to their value in the wild hey have to traverse, and enables their driver to manage them without a out simply by the word of command, to which they rapidly accustom them- especially when rendered emphatic by the sharp crack of the resounding . In the army service mules have been very extensively employed, and asingly so within a few years. The teams consist of four and six animals, h are found to draw as much as horses, to be more easily maintained, and ure more hardships. It is a common saying that "a mule never dies," his has not been verified in the service. Upon the farm they are very liked by those who employ them, and they are peculiarly adapted to of the labor to be performed. In deep ploughing, in heavy soils, most s might be considered too light for this kind of labor, which is supposed to more weight of carcass to be thrown against the collar in the steady and us draught requisite to carry the large turning plough through such a ; but with a lighter furrow, on loose, sandy, and gravelly soils, mules are to make an excellent team, their quick step and their peculiar configura- ing them track all their feet in nearly the same line, which with the small r their hoofs adapt them most happily for the cultivation of what are termed crops. In this work the intelligence of the mule keeps him from treading the young plants, and his close walking enables us to run a suitable cul- tor between rows that are very close together in such crops as carrots, tur- and other vegetables that constitute the majority of our hoed crops. So, also, the garden, the mule becomes a most valuable assistant; and, indeed, re are a thousand places which he can fill better, or at least as well, as the noble animal which is usually assigned to such services. Mules have long the favorite draught animals of the southern plantations; and, with many the mule and the negro are intimately connected by association, under ression that the obstinacy and hardiness and endurance of the one, were y adapted and related to the low degree of intelligence and brutality of ner. Hence, also, a most mistaken estimate of the intelligence and value mule. For while we may with great propriety claim that the mule has ful powers of endurance that enable him to bear unnumbered cruelties are heaped upon him, and that, therefore, he is better adapted to suffer ontact with an ignorant race, degraded by slavery and its attendant de- and demoralizing influences, still, we must be allowed to assert on lf that he is a most intelligent, affectionate, and excellent creature, and his powers of endurance, as well as his adaptation to a warm climate, ave caused him to be so generally adopted in the south, where long expe- has shown his superiority to the horse for the fatigues and neglects to he is liable to be subjected at the hands of the careless and brutalized

very rarely used in this country for any purpose except for cross- with the mare in the production of mules. In other parts of the world, these animals are numerous, and are considered useful, being well light work, and suited, by their cheapness, in the first outlay, and istence, to the wants of the poor, and also because, from t

organization, they are especially adapted to sterile, stony, and rocky and mountainous regions, and even to torrid climates. The ass is historic, appears to have been domesticated at a very early period of the world's his and he is found at the present day in a state of nature or wild in the s re- gions, where, we read in the Bible of the wild asses snuffing up the w So also in the very earliest history of the human race we read of the hyom animal, the mule, having been a familiar object; and, indeed, in the book of Genesis we find mention of the mule before the horse has been named. Mules are admirably adapted to torrid climates, and they will subsist under very un- favorable circumstances of soil, climate, and exposure to hardships where the horse could not be sustained. In England, where the donkeys are the property of the poor, and are considered of little value, and where the poorer mares used for crossing, the resulting mule is an inferior animal, and is employed very subordinate situations, though admirably adapted for the subter occupation of dragging coal cars in the mines where a larger beast could not along. In southern latitudes, however, where the mule rises into impor from its being peculiarly adapted to the attendant circumstances of soil and climate, and where the jacks are more noble, and are bred with more ca donkey is a much larger and finer beast, and the resulting cross, when pro mares are employed, is a superior animal. Some of the finest jacks in t country for a long time were of the Maltese breed, the first of which was s by La Fayette to Washington in the year 1787. He was the first "Knight Malta" in this country, where now so many may be found, and his pr highly valued. After the death of Washington, eight of his mules were $200 apiece, and these were probably the get of this so-called "Knight of Malta."

This item from history not only shows that mules were highly and appreciated at that early period, but also that the immortal Father of Country, when retiring from the arena of public life, attended scrupulously to the details of the farm, and brought his great sagacity to bear upon the pro breeding, rearing, and breaking of a mule for his plough and wagon, as he ever done in directing the movement of armies raised to defend our borde or in guiding the ship of state through the troublesome breakers of the poli storms that attended and followed our first great revolution. Washington's "Knight of Malta" is described as having moderate size, great activity, clean limbs, possessing the fire and ferocity of a tiger, and as being of a brown color, with white belly and muzzle. Professor Low, in his excell work on Practical Agriculture, pays a just tribute to the ass, which he says "has been the servant of man from the earliest records of the human race. has come to us from the south and east, and it is there that he is seen in perfect state. Were we to judge of the value and importance of this cr from the feeble services he is able to render us in the oppressed and degra position he occupies in this country, we should form a very false estimate of importance. He is the inhabitant of the desert, and an invaluable serv the regions in which nature has fitted him to exist. But yet, more t n he is endowed with the power of propagating a race of creatures of the n importance to the inhabitants of many countries. The mule, as an animal o burden in a rocky and precipitous country, far exceeds the horse or any o animal; and some countries would remain separated from one another by passable barriers, were it not for the matchless sagacity, patience, and footedness of this creature."

It is in the south of Europe, and in an especial manner the mou parts of it, that the mule is regarded as important in rural economy. I es is capable of being cultivated in the colder countries. He possesses the properties which fit him for innumerable kinds of lighter labor; he is lived and remarkably exempt from diseases, especially of the limbs; and l

ed on far inferior kind of food to that required by the horse. The
y which presents itself in rearing him to the same perfection in the
regions as in the warmer is, that the male parent cannot be brought
fection in the former. This is a difficulty, however, which does not
y to those extensive regions of our own favored land, which have been
given to the production of the mule. In the famous blue-grass region,
preads over a large portion of the great basin styled the valley of the
ppi, the well-selected jacks and jennies have been almost naturalized,
er the influence of abundant food and a suitable climate, with judicious
and skill in their breeding, they have really improved upon our hands
t introduction among us; and the American mules, many of which
m high blood on the side of their dams, will compare most favorably
nose of any other portion of the world. In the mule we have the size
activity of the horse, combined with the form and hardihood of the ass,
he surpasses both his parents in sure-footedness and in longevity, and
nore endurance and greater power of recuperation from fatigue and ex-
on when excessively worked. Well-bred mules are as spirited, and
active, or even quicker than horses, if perfectly broken. They will
and in the draught they pull even more steadily. Their intelligence
great that they may be trained very readily either to the line or to the
and many splendid, large teams are driven, even over rough ground
there is scarcely any road, perfectly guided by the voice of the teamster,
only by the loud crack of his whip, which they understand as a sound
ouragement rather than as an intimation of impending torture.

e the commencement of the rebellion the routine of the mule trade has
iverted from the usual course of former years, and the immense extent
government transportation has directed attention to this branch of in-
. Hence the value of this animal has become of such increased propor
that the raising and feeding of mules has attracted much attention.

procreation of these creatures the selection of the jack is of the first
ance. Great improvement has been made in the mule since the intro-
n of the Spanish jack into this country, which has resulted in giving us
that come to maturity earlier than the old Maltese stock, besides
more size and better action. In the production of mules for govern-
se the jack should be from fourteen to fifteen hands high, with a good
of body, depth of chest, and with a round barrel, as indications of a
constitution. He should have heavy, flat-boned limbs, a long, thin face,
, thin under jaw-bones. His ears should be carried upright, and they
not be too thick. The animal should have a sprightly temper and ap-
nce, as these qualities will almost always be transmitted to his progeny.
jack must be fed with a view to the maintenance of the greatest physi-
r, so as to produce an even lot of colts, and to this end he should
e allowed to serve more than fifty mares during the season of three
. He should be provided with such food as will give him strength
inducing feverishness. Natural exercise, with the freedom of a grass
l always be allowed, when practicable. Animals designed for cross-
mares should be kept from any intercourse with their own kind, as
n become entirely useless for cross-breeding when allowed contact
r own species.

production of mules, mares should be selected that have large,
odies on short, strong limbs. They should have good, sprightly tem-
w attainable, the more they have of cross with the thorough-bred
l , if the above requisite of form and strength shall have been

w the jack is generally owned by the mule-feeder, who places him
times having two or more stations, and moves him from one

to the other at stated periods. He engages the use of the mares in each borhood at a given price for the product. In such cases contracts are with the owners of the mares to deliver the colts in sound condition at a place and date, where the feeder collects his crop, as it is often termed.

A horse should always be used as a teaser to try if the mare be in because mares will often allow the jack to serve them after having been by a horse, when their natural timidity would have caused them to refu approaches by the jack without such preparation. Moreover, it saves th from an undue excitement in trying to overcome the antipathy whicl mares have to the very sight of him. Mares should be bred to the jacl in the spring, so that the colts may have sufficient age before winter s Besides, if they are all weaned at the same time, they will have the adv of beginning their feeding alike, and they will remain more uniform dur winter.

TREATMENT.

Mules are timid animals, possessing also a great amount of curiosity i composition. Affection strongly characterizes all their actions; but th sess a peculiarity unusual in most domestic animals, that of resentii injury. From this circumstance they have received the credit of vici and stubbornness, which, by a proper study of their characters, and by treatment from the beginning, can, in most cases, be overcome. It is easier to train up a mule in the way in which it is to go, and to fit it purposes for which it is intended, than to overcome any bad propensity from years of mismanagement. Therefore, upon the collection of the weaning time, they should be placed in an enclosure from which ther possibility of their escaping until they shall have forgotten their dam this means the first step is taken to prevent the formation of one of their propensities—that of being "breachy." At all times one should move the colts quietly, and without evincing any outward manifestations of fe in this way will soon gain their confidence, and, after a very few da feeder will be in perfect safety from injury.

If during the first summer any of the colts should have been taught tricks, care must be taken to avoid receiving harm from them; and befor months, if they be kept away from the bad associations, the tricks forgotten.

Feeders succeed best when the colts are collected about the same ti enough for them to become accustomed to the change of food before t in of cold weather, and late enough to avoid the great annoyance and which young stock suffer from the flies.

The period usually considered best for gathering the crop is from t to the end of September. When the colts are collected and brought t in this way, they form mutual attachments which last until they are se They should be furnished with good pasture, and should be fed with gr a day, which usually consists of oats, mill feed, or green corn. If obl confine them when first collected, green corn, cut up with the stalks, sh given frequently in small quantities at each time, so as to entice them and to encourage their appetites. This may be alternated with dry mill feed. A constant supply of pure water is very desirable; for, tho mule is capable of enduring greater irregularities in feeding and vicissit the weather than the horse, still success in feeding depends upon havi and water convenient and accessible to the stock. When these arran are properly provided, the mule is a very light feeder; but he wants often, and should be furnished a variety of food, so that he may parta according to his fancy.

Many prefer a wood-lot for wintering their mules, if the ground be f

VAN IDDEN-SNYDER
MULE

r, and not liable to become too muddy. They assert that the mules are less y to suffer from colds and coughs, which run into distemper, than when ined to stables or sheds.

At all times their food should be given in such proportions and of such nature as to insure a free passage from the bowels; for constipation brings on fever, as well as colds and distempers, which is a very prevalent disorder among colts during the first winter; hence the importance of taking care to work it off with loosening food. Corn is the great food for all kinds of stock in the west; but young colts require a portion of their food to be of a more digestible character, producing more growth of muscle and less fat; therefore, after the grain has become hard and the stalks have dried, the colts should be provided with wheat bran, mixed with corn meal, or the richer kind of offal from wheat generally sold by the millers as "middlings;" and for the "roughness," as we term it, give them all the clean wheat straw or corn fodder they will eat, with an occasional change to *clover hay*. Colts will consume an average of about six or seven pounds of the middle feed each day through the first winter. If there be a tendency to constipation, unthreshed Hungarian cut when the seed was nearly ripe, is the best food to relieve the difficy. A portion of this hay placed where the colts can have easy access to ires a good state of the system, and many feeders find it to be invaluable. oal mixed with ashes in equal proportions, should be placed under shelter, where it can be at all times accessible to the colts, for nature will direct them o the quantity and periods when it should be consumed, and if given in this it will never be taken in excess.

If colts be stabled, care must be taken to provide clean dry bedding, and if their feet become diseased, as is frequently the case, where they are exposed to wet, a strong solution of sulphate of copper in vinegar, applied after a thorough ing with soapsuds, will almost always effect a speedy cure. This disease *must not* be neglected, for it it be allowed to continue, the general health of the animal will suffer, and its hoof becoming deformed, the value of the mule will be very greatly depreciated.

Castration is done by many breeders during the first summer, while the colt is still with the mare, but it is more commonly postponed until the animals are hing one year old and before they are turned out to pasture. The ion is performed in the same manner as with horses; some using clamps, s *searing* with a hot iron. Castration should be done before the flies are esome, and the colts should not be allowed to roll in the dust for fear of ecting the free discharge of the suppuration.

During the summer, the care of the stock consists in regular salting, and the occasional trimming a hoof that may have assumed an unnatural proportion of length or shape, which by a little care may be rendered straight and perfect. A month of feeding on grass alone through May, purifies the system from the s that may have arisen from colds and distempers, and have been con- d in the blood in consequence of high feeding with grain. After this of diet has produced its effects, a regular feeding of grain with the grass, ge advantage of a tendency toward early maturity; for in mule raising it im, that what is gained in time is saved in the amount of food con- d. Besides, this grain fed during the fly season insures a constant and growth, which is so desirable that it should always be obtained if pos-

by 1 1st of September, yearling colts are very apt to be restless, and if osures are not very good, they will become breachy; it is therefore period to put them up for their regular fall and winter feeding. should be placed in a small lot or open shed and fed with whole op wide troughs, which should be four feet across and eighteen or s deep, and raised from the ground so that the sides shall be three

feet high. The stalks may be thrown into these troughs as they come fr the field; or the fodder may be cut up, and may be continued as long as the stalks are soft. After this, if stabled, they should be fed with corn from the shock, with the addition of mill feed each day. Beside this, Hungarian grass and wheat straw should at all times be kept within their reach for the sake of providing a variety of food, for the greatest success depends upon keeping up a good appetite by constant regular feeding.

During the second summer, if soiling be practicable, a large amount of food may be saved by adopting this plan, for at this age, mules are very restless and uneasy, and are constantly roving about, and thus destroy more food than they consume.

By giving them a regular feed in a good lot which is sufficiently large for exercise, they will make a better growth and are less liable to the injuries to which they are incident when running in the pastures. Grain or mill feed should be provided, at least through that part of the summer when flies are troublesome, if not, indeed, throughout the season; otherwise, they will not consume enough food to keep them in good condition.

The second winter the same treatment is required as in the first, but as they are older, corn alone will answer for their food, because it is desirable to push them forward for an early market when they have become two years old.

During this period it is necessary to watch their feet carefully, because while we are pushing the animal to an early maturity the lower part of the hoof is often disfigured, because its growth is in excess of the wear, and will require to be pared off.

BREAKING.

In breaking colts for farm use, it is best to begin when they are coming two years old, and by using them at light work during the third year they will have a quicker step than if they were allowed to attain their full maturity and then set at once to heavy work.

The first lesson for the mule-trainer, before attempting the management of these animals, is to learn to govern himself; and the sooner the barbarous custom of choking a mule almost to suffocation is abolished, the better. By this treatment the animal suffers a shock, both mental and physical, that in many cases injures the constitution of the animal without conducing to its proper training.

The mule should be led or driven into a confined stall or stocks, from which he cannot by any possibility escape; in a very short time he will cease struggling; gentle handling with quiet soothing words will soon give him confidence when the gears or harness may be put upon him. The company of his mate if he have one, or the presence of another animal, with which he is to be worked, aids in alleviating his fears. Avoid the possibility of his breaking away when released, for success depends upon the result of this first effort and the impression made upon him. After being hitched to the wagon the trainer should endeavor to repress too great eagerness in the animal, lest, by being overtasked, he become discouraged. By kind treatment mules may be rendered the most docile and affectionate creatures among our domestic animals, and will often show more intelligence than the horse.

STATISTICS.

Whether it arise from a greatly increased demand for these beasts in our country, which is now swollen by the enlarged wants of the army and its immense transportation, or whether it has come from a higher appreciation of the mule, it is certain that the number produced at the present time was greater than at any former period of our history. Some shrewd turists may have made the discovery that it costs less to breed

, suitable size than a horse; that less time is required to prepare a les than a lot of colts for the market; that young mules may be sold t any period and in any amount; and more than this, that they uni- mmand a higher price than a drove of horse colts of similar relative nd value. Moreover, it may have become apparent that mules are o fewer diseases, that they are less liable to serious accidents, and y are altogether more certain of producing satisfactory results from duction than horses. All of which may be set down as well-estab- tions. The fact remains, (whether explained or not, is immaterial,) mules of the United States have greatly increased in numbers during de between the census returns, as will appear by a comparison of the rnished by the Census Bureau; and we have every reason to believe resent the supply is keeping up with the demand, notwithstanding the xhaustion, both of men and mules, consequent upon the fearful war consigned so many of both to early graves. The census tables show number of mules produced has increased in a greater ratio than those her kind of farm stock, and that from 1850 to 1860 the total number nimals had more than doubled.

mparative figures below are extracted from the preliminary report of h census. They show at a glance the great increase of mules during ears from 1850 to 1860 in some of the States where they are most ly employed in agricultural labors. Asses are included, but their are comparatively so small as not materially to affect the result.

ble showing the number of mules and asses in the United States.

	1850.	1860.
.....	59, 895	108, 701
.....	11, 559	44, 158
.....	1, 666	13, 744
.....	791	2, 294
.....	5, 002	10, 909
.....	57, 379	101, 069
.....	65, 609	117, 639
.....	44, 849	92, 259
.....	5, 644	9, 829
pi	54, 547	112, 488
.....	41, 667	80, 941
arolina	25, 259	51, 388
olina	37, 483	66, 456
.....	75, 303	119, 221
.....	12, 463	63, 000
.....	21, 483	41, 014
. total in the whole United States at the od	559, 331	1, 129, 553

of mules in ten years, 570,222.

h the consideration of this subject to a conclusion, it is to be re- it s been found impossible to collect reliable data upon some i erest to the farmers and economists of the country in regard The absolute cost of breeding and rearing a mule to a sale- not be ascertained, nor could the comparative expense of rear- be learned with any better success.

The following is the number of horses and mules on hand in the army J 30, 1862, together with those purchased, captured from the enemy, and those that have died, been lost and sold, from that date up to May 31, 1864 furnished from the office of the Quartermaster General:

	PURCHASED.		CAPTURED.		SOLD, DIED, & L	
	Horses.	Mules.	Horses.	Mules.	Horses.	Mul
Stock on hand June 30, 1862..	24,025	23,814	.....	.....	.....	.....
Purchased, captured from the enemy, died, lost and sold, from June 30, 1862, to June 30, 1863.....	173,832	86,254	7,783	6,915	57,676	17,
Purchased, captured from the enemy, died, lost and sold, from June 30, 1863, to May 31, 1864....	173,182	78,298	17,514	8,091	103,408	54,
Total.....	371,039	188,366	25,297	15,006	161,084	71,

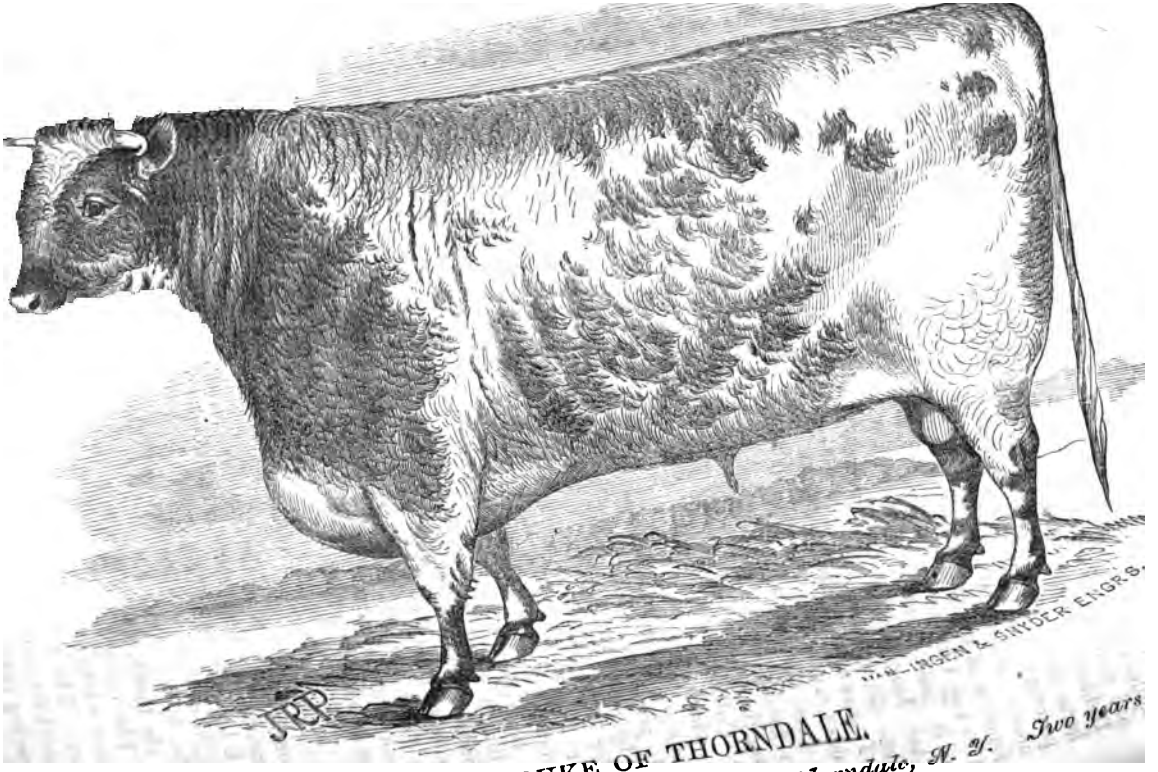
Imperfect, however, as is this paper, it is respectfully submitted with a h that it contains some hints and details of practice that will be of some us the American agriculturists.

SHORT HORN CATTLE.

THIS breed has attained a distinction and won a substantial apprecia which no other race has so fully and widely enjoyed among the enlighte graziers of the world. From Great Britain its dissemination has extende the continent, to Australia, to South Africa, South America, Mexico, and West Indies, while it has secured almost a monopoly of the importation this country and of Canada. For the grass pastures of the Ohio valley, the abundant, natural, and cultivated grasses of the broader prairies of Mississippi region, it is admirably fitted, and held in high esteem as the r economical machine for the speediest conversion of corn and grass into and money.

THEIR ORIGIN.

The original short horns occupied the east of England, Yorkshire, and valley of the Tees at the date of the earliest records of British stock-grow They were various in size, color, and other peculiarities; the dark-skir herds of the fens resembling the black cattle of the Holland marshes, and finer forms of Yorkshire and Durham assuming the style and quality of noted cattle of Holstein and Jutland; and yet it may not certainly be l whether the ancient immigrants from those localities brought this st England, or whether this similarity is the result of climate and k was, at least, a race very distinct from that of Ireland land, with long horns, thick skins, and a heavy c their protection in a climate subject to continuo



SIXTH DUKE OF THORNDALE.

Short-horn Bull, bred and owned by Samuel Thorne, of Thorndale, N. Y. Two years

own in later times that Dutch and Danish importations modified these cattle the east of England, and suggested the more recent and greater improvements of Charles and Robert Colling, commencing about the era of our revolution, and continued successfully since by Messrs. Bates, Booth, Townley, d others in England, and Thorne, Alexander, and other breeders in this untry.

While Bakewell was pursuing his experiments with the long horns of the est, then regarded as superior to other breeds, and perfecting his Dishley ttle, reducing their size, giving a full cylindrical body, softening the skin d reducing the bone, very much in the manner of his improvement of the shley or Leicester breed of sheep, it occurred to the Collings that the short rns were more susceptible of improvement. The result has proved their suority. The Dishleys are now only bred for the production of bulls to cross on common stock for early maturity. The story of the bull Hubback, the under of the modern short horn, has often been told. He was purchased in 83 by Charles Colling of his brother and a Mr. Waistell for eight guineas, d is said to have been from a cow grazed by a poor man on the highway. has long been a matter of controversy whether he was a pure-bred Tees-ter, the short horn of that day. He was somewhat below the usual size of Teeswaters, yellow, red, and white in color, of a fine, compact form, adrable touch, and so easily fattened that he early became useless as a bull. e cow, also purchased by Colling, acquired fat very rapidly, and never ain bred. Either from mere curiosity or from a suspicion that he was imiring the constitution of his animals by continuous breeding in too small a cle, Colling attempted the experiment of infusing some of the Galloway od, which was confined, it is understood, to a single cross upon certain iniduals of his herd. At the sale of Charles Colling, in 1810, forty-seven imals produced 8,911 guineas. Robert Colling, not so renowned, but esd by many quite as judicious a breeder, sold sixty-one (but six of them us) for 7,484 guineas. High prices have been maintained by later breed-. Mr. Bates, in 1850, sold one family of Duchess stock, including calves, an average of $581. Lord Ducie's herd, in 1853, realized an average of 60 for sixty-two animals. Individuals of superior excellence, from the day en Colling's "Comet" sold for 1,000 guineas, have commanded fabulous ces. Similar prices have been obtained in this country.

There were at least five hundred herds of pure-bred short horns in Great itain ten years ago, and from six to seven thousand head are registered in herd-book every alternate year at that period, and these numbers are yearly reasing in accelerating ratio.

CHARACTERISTICS.

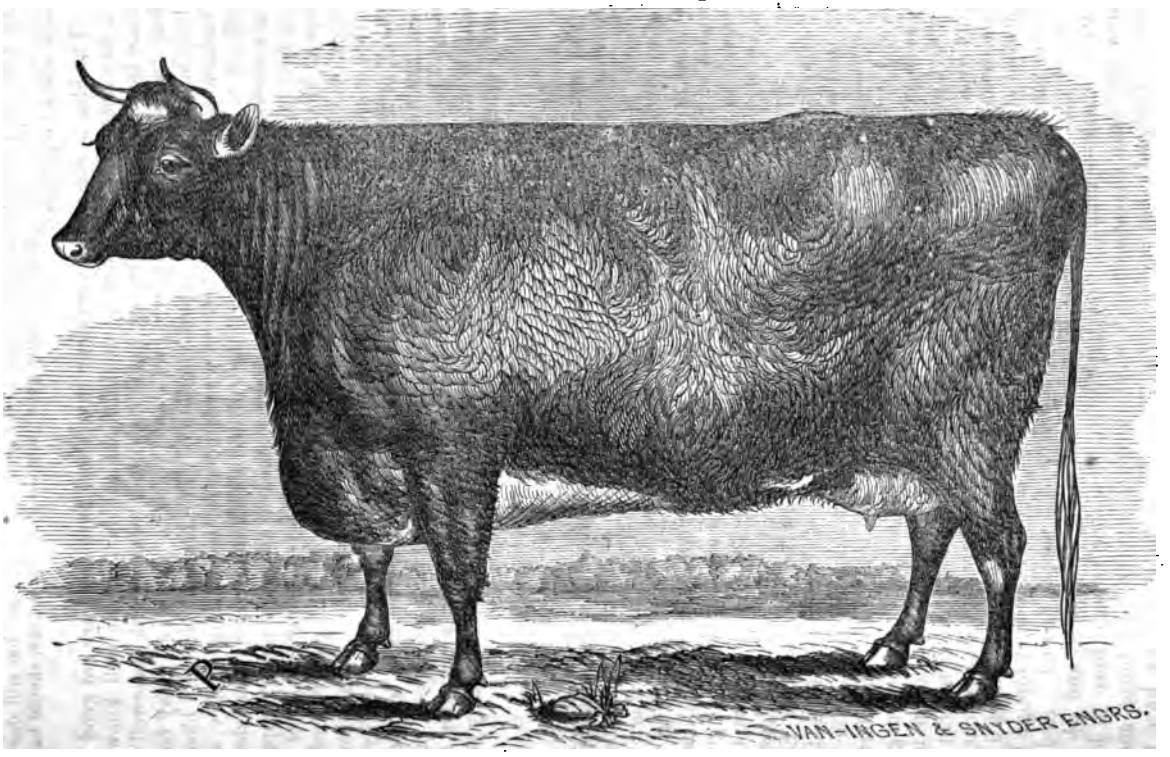
Derived from a large breed, the improved short horn is heavy, less in height the originals of the Tees, rounder and deeper in the trunk, the limbs shorter, and back broader, appearing less in bulk, while really greater in weight. e skin is light-colored, hair reddish brown or white or mixed, the muzzle h-colored, the horns shorter and lighter-colored than in the former breed, skin soft to the touch, the form square, the shoulder upright, and the hindter large. The color cannot be characterized by a single term, varying ly from a pure white to a rich red, a mixture being the fashion, known as n or strawberry. The skin should be velvety and not too thin, while the r should be plentiful and of a mossy softness. The head of the female is r and more tapering than that of the male, the neck thinner and lighter, and shoulder inclining to narrow towards the chine. The short horn looks er than he is. He excels all other stock in facility of fattening, making and heavy beef in thirty months, and even in two years. Henry Strafexcellent judge, thus sums up his points:

"The head of the male animal is short, but at the same time fine; very broad across the eyes, but gradually tapering to the nose, the nostril of which is full and prominent; the nose itself of a rich flesh-color, neither too light nor dark; eyes bright and placid, with ears somewhat large and thin. The head, crowned with a curved and somewhat flat horn, is well set on to a lengthy, broad, muscular neck; the chest wide, deep, and projecting; shoulders fine, oblique, and well formed into the chine; fore legs short, with the upper arm large and powerful; barrel round, deep, and well ribbed up towards the loins and hips, which should be wide and level; back straight from the withers to the setting on of the tail, but still short—that is from hip to chine—the opinion of many good judges being that a beast should have a short back with a long frame."

The idea is somewhat prevalent that short horn cows are not good milkers It has been obtained, without doubt, from the fact of the well known efforts made to perfect their fattening qualities, in accordance with Bakewell's saying that "all was useless that was not beef;" and it is true of many families of short horns. Others are superior milkers. The original Holstein blood of the Durham and Holderness districts was famous for its milking quality, and it is difficult to breed it out with all the culture which modern improved short horns have received. The modern Holderness stock at this day chiefly supplies the London dairies, and many of their best milkers have strong strains of the improved blood. The Duchess stock, of great celebrity and purity, bred by Mr Bates, was distinguished for its excellence in this respect. Some short horns in this country have yielded ample supplies of milk of excellent quality. J. H Powel, of Pennsylvania, once claimed to have obtained from an imported short horn 28 quarts of milk, which yielded at the rate of 20½ pounds of butter per week. It will be found true that the short horn, for the production either of meat or milk, is eminently fitted, and may be made pre-eminently so with a careful selection in either direction.

THE THORNDALE STOCK.

The strange and noteworthy fact that an American breeder has shipped to admiring purchasers in England the descendants of former importations is a sufficient apology for allusion here to a single herd of American short horns—that of Samuel Thorne, of Thorndale, New York. Notwithstanding the professional pride of the English breeder, and a tenacious adhesion to his favorable opinion of English superiority in cattle growing, these animals have given the greatest satisfaction and received the highest commendation from the best judges of that country. The singularity of the circumstance is lessened in view of the fact that Mr. Thorne has culled from the best herds in England and bought those of Messrs. Morris and Becar, of New York, to add to his own, and with these combined herds has surmounted all obstacles, in feeding and climate, through the exercise of untiring care and judicious effort. The ups and downs of the business of breeding here, the quickly alternating fluctuations in price, have given fine opportunities for shrewd Englishmen to come over and pick off some of the best of our stock, to the great detriment of our future in stock improvement. It will be many years yet before our native cattle throughout the country shall be generally modified and moulded into an improved stock, through the influence of pure blood of the best foreign breeds and the time has not yet arrived when a drop of it can be spared. And it is to be hoped that some American Bakewell or Colling may arise, and do for our "native" cattle—certainly they have been bred long enough here to have acquired American characteristics—what they did for the long horns and short horns of England; but such a work cannot be expected till we have made a further and more universal advance in the direction of improvement in our horned cattle. Colonel Jaques, of Ten Hills farm, near Boston, Massachusetts conducted, for several years, experiments of this nature with great success, and it is much to be regretted that they were not continued after his death. The following is a notice of the shipment made by Mr. Thorne in May, 1861, from the London Agricultural Gazette:



THIRD DUCHESS OF THORNDALE.

Short-horn Cow, bred and owned by Samuel Thorne, of Thorndale, N. Y. Six years old.

"[illegible] second Duke of Thorndale has been sold to Messrs. Howard & Robinson for 400 [illegible]; the third Duke of Thorndale has been sold to Mr. MacIntosh for 300 guineas; the Duke of Thorndale has been sold to Mr. Hales for 400 guineas; the Thane of Oxford [illegible]een sold to Colonel Pennant for 250 guineas; Imperial Oxford has been sold to Mr. [illegible] for 200 guineas; 4th, Lady of Oxford has been sold to Mr. MacIntosh for 250 [illegible] so have thus averaged 300 guineas. Besides these, a young bull, Hero of [illegible], has been sold to Mr. Welch for 200 guineas. These seven animals have thus [illegible]0 guineas; and Mr. Thorne has received the same he gave to English breeders some years ago for their sires, the two Grand Dukes."

In the report of the meeting of the Essex society, the third Duke of Thorndale and fourth of Lady of Oxford, which were exhibited, but not in competition, were alluded to as constituting a feature of no little attraction, with the closing assertion that this "American bull is a superb animal, thick, deep, fleshy, and symmetrical, and of first-rate quality."

The following are the pedigrees of the animals illustrating this article:

SIXTH DUKE OF THORNDALE.

Roan; calved February 3, 1862; bred by, and property of, Samuel Thorne, Thorndale, Washington Hollow, Dutchess county, New York; got by 3d Duke of Thorndale; dam 4th Duchess of Thorndale, by 2d Grand Duke, (12,961;) g. dam Duchess —, by Duke of Gloster, (11,382;) gr. g. dam Duchess 66th, by 4th Duke of York, (10,167;) gr. gr. g. dam Duchess 55th, by 4th Duke of Northumberland, (3,649;) gr. gr. g. dam Duchess 38th, by Norfolk, (2,377;) gr. gr. gr. g. dam Duchess 33d, by Belvidere, (1,706;) gr. gr. gr. gr. g. dam Duchess 19th, by 2d Hubback, (1,423;) gr. gr. gr. gr. g. dam Duchess 12th, by the Earl, (646,) gr. gr. gr. gr. gr. g. dam Duchess 4th, by Kelton 2d, (710;) gr. gr. gr. gr. gr. g. dam Duchess 1st, by Comet, (155;) ——, by Favorite, (252;) ——, by Daisy Bull, (186;) ——, by Favorite, (252;) ——, by Hubback, (319;) ——, by J. Brown's Bull, (97.)

THIRD DUCHESS OF THORNDALE.

Red; calved March 14, 1858; bred by, and property of, Samuel Thorne, Thorndale, Washington Hollow, Dutchess county, New York; got by Duke of Gloster, (11,382;) dam Duchess 66th, by 4th Duke of York, (10,167;) g. dam Duchess 55th, by 4th Duke of Northumberland, (3,649;) gr. g. dam Duchess 38th, by Norfolk, (2,377;) gr. gr. g. dam Duchess 33d, by Belvidere, (1,706;) gr. gr. gr. g. dam Duchess 19th, by 2d Hubback, (1,423;) gr. gr. gr. gr. g. dam Duchess 12th, by the Earl, (646;) gr. gr. gr. gr. gr. g. dam Duchess 4th, by Kelton 2d, (710;) gr. gr. gr. gr. gr. gr. g. dam Duchess 1st, by Comet, (155;) gr. gr. gr. gr. gr. gr. g. dam ——, by Favorite, (252;) ——, by Daisy Bull, (186;) ——, by Favorite, (252;) ——, by Hubback, (319;) ——, by J. Brown's Red Bull, (97.)

CHARACTERISTICS OF AYRSHIRE CATTLE.

BY SANFORD HOWARD, OF LANSING, MICH., SECRETARY STATE BOARD OF AGRICULTURE.

THE leading cattle-breeders of Britain have of late years, for the most part, [illegible] to establish in their stock some particular property in a high degree, beef [illegible], according to circumstances, being the leading object. Hence it has [illegible] that British cattle have latterly been classed under the heads of "beef [illegible] and "milk breeds." Prominent among the latter is the Ayrshire breed, [illegible]riginated in the county of Ayr, Scotland, and within the last fifty years [illegible] disseminated over every part of that country where dairying is much [illegible]

[illegible] breed has also been established in the north of Ireland, forming in sev[illegible]ties the leading stock. A great number of the cows are annually [illegible] various districts of England, while in several countries of continental [illegible] breed has been introduced, and is propagated with care.

It has also been introduced into the United States and the British provir of North America, and, at the present time, is probably more extensively k as a dairy breed than any other in the world.

Importations of Ayrshire cattle into this country were made upwards twenty years ago, but the animals were neither numerous nor generally in hands of persons who took much pains to increase them. It was not, theref until a comparatively late day that the Ayrshires were much known here that specimens were sufficiently numerous to indicate the permanent establ ment of the breed in this country.

A few remarks in regard to the origin of this valuable breed of cattle, in c nexion with their comparative value for dairy purposes, may not be out of pl

It is evident that the modern Ayrshire breed presents a wide contrast to t which occupied the western portion of Scotland many years ago.

Aiton, in his "Dairy Husbandry," speaks of the cattle which occupied A shire fifty years before the time, when he wrote (1806) as follows: "The c kept in the districts of Kyle and Cunningham (districts of Ayrshire) were diminutive size, ill-fed, ill-shaped, and yielded but a scanty return in m they were mostly of a black color, with stripes of white along the chine or ri of their backs, about their flanks, and on their faces; their horns were l and crooked; their pile (hair) was coarse and open, and few of them yiel more than three or four Scotch pints (six to eight wine quarts) of milk a c

A comparison of these points with those presented by the present bree Ayrshire cattle renders probable the conclusion of Youatt, that the pre stock could not have arisen entirely from the old. It follows, therefore, the modern breed, like various other valuable breeds of domestic animals, o nated in crossing. The question as to the breeds from which it was der will be briefly considered.

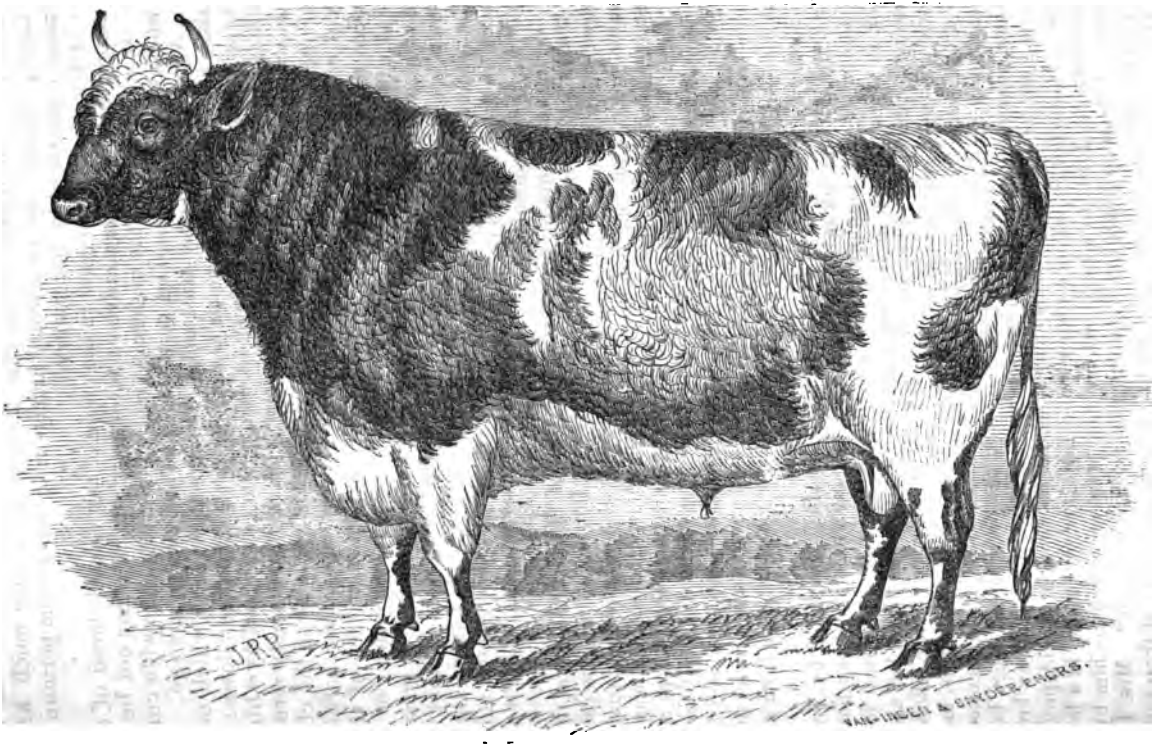
Various accounts represent that the Earl of Marchmont, some time betv 1724 and 1740, introduced to his estates in Berwickshire some cattle, coi tured (their history was not positively known) to be of the Holderness or T water breed, and that not long afterwards some of the stock was carrie estates belonging to the same nobleman in that part of Ayrshire called K

But it is not improbable that the chief nucleus of the improved breed wa "Dunlop stock," so-called, which appears to have been possessed by a di guished family by the name of Dunlop, in the Cunningham district of Ayrs as early as 1780. This stock was derived, at least in part, from animals ported from Holland.

The Dunlop cows soon became noted. Rawlin, (as quoted by Youatt,) wrote in 1794, speaking of the cattle of Ayrshire, says: "They have anc breed, called the Dunlop, which are allowed to be the best race for yiel milk in Great Britain or Ireland, not only for large quantities, but also for ness and quality." This, though perhaps extravagant praise, shows tha stock possessed remarkable properties at that early day. It was, indeed, in great esteem still earlier. In Youatt's "Treatise" it is mentioned, speaking of the cattle of Dumfriesshire, that the poet Burns, when he occ a farm near the city of Dumfries, not content with the Galloway breed, i duced some of the west country cows, which he thought would produce milk. In the poet's published correspondence allusion is made, in a letter November 13, 1788, to a heifer which had been presented to him by the prietor of Dunlop house as "the finest quey in Ayrshire." Mrs. Dunl will be recollected, was a special friend and correspondent of the poet.

As a further explanation of the preference given by Burns for the " country cows," it may be mentioned that the writer, when visiting Scotlan the purchase of Ayrshire cattle in the year 1858, had several interviews the poet's sister, the late Mrs. Begg, of Ayr, in one of which she stated her brother, during his occupancy of the farm of Ellisland, near Dumfries, "

PLATE XXIX.



HAROLD.

... the property of Peters, of Southboro', Mass. Four years old.

l made considerable of cheese." His efforts to procure the Ayrshire
that they had, even at that time, a high reputation for this object.
e Couteur, in a paper on the Jersey or Alderney cow, published in
ıl of the Royal Agricultural Society of England, refers to a statement
ɜ that the Ayrshire was a cross of the Short-horn and Alderney, and
self, that "there is considerable affinity between the two breeds,"
he Ayrshire and Alderney.
also says, in reference to the Ayrshire breed: "It is said to be a mix-
ılls brought from the Island of Alderney with their own, or the old
ws."
says: "At some period or other there has evidently been a cross with
ım or Holderness, and perhaps, also, with the Alderney breed."
ɔr Low, in his "Illustrations of British Quadrupeds," says: "From
dence of which, in the absence of authentic documents, the case ad-
airy breed of Ayrshire cows owes the characteristics which distinguish
ɜ older race, to a mixture of the blood of the races of the continent, and
ʏ breed of Alderney."
tion to the foregoing evidence respecting the origin of the Ayrshire
hould be stated that the present leading type of the breed was formed
an infusion of the blood of the Kyloe or West Highland breed. This
in the first instance, probably, in what has been called the Swinley

ts, as authentically obtained by myself in Scotland, on this point are
lly as follows: Theophilus Parton, of Swinley farm, near Dalry,
about forty-five years ago, took great pains to establish a herd of what
ned the best Ayrshire cattle, into which he infused a strain of the
hland blood, the particular degree of which is not publicly or gene-
wn. The Swinley stock differs from the older Ayrshire in having a
ad, with more breadth across the eyes, more upright and spreading
ɔre hair, and that of a more mossy character, and generally better
ɔns. They are also somewhat smaller boned than old stock, though
r superior symmetry and greater tendency to fatten they are fully
he former in weight of carcass when slaughtered.
lowing points given by the Ayrshire Agricultural Association in 1853,
ating superior quality," will give an idea of the standard of Ayrshire
ecognized by the leading breeders: Head short; forehead wide; nose
een the muzzle and the eyes; muzzle moderately large; eyes full and
orns widely set on, inclining upwards, and curving slightly inwards;
; and straight from the head to the top of the shoulders, free from loose
ıe underside, fine at its junction with the head, and the muscles sym-
ʏ enlarging towards the shoulders; shoulders thin at the top; brisket
ɜ whole fore-quarter thin in front, and gradually increasing in depth
ı backwards; back short and straight; spine well defined, especially
ulders; short ribs arched; the body deep at the flanks; and the milk
l developed; pelvis long, broad, and straight; hook (or hip) bones
t, and not much overlaid with fat; thighs deep and broad; tail long
er, and set on a level with the back; milk vessel (udder) capacious,
ding well forward; hinder-part broad, and firmly attached to the body;
or under surface nearly level; the teats from two to two and a half
length, equal in thickness, and hanging perpendicularly; their dis-
rt at the sides should be equal to about one-third the length of the
. across to about one-half of the breadth; legs short, the bones fine,
joints firm; skin soft and elastic, and covered with soft, close, and
r; the colors preferred are brown, or brown and white, the colors
tly defined; weight of the animal when fattened about forty impe-
(that is 560 pounds,) sinking the offal.

As to the annual returns of Ayrshire cows in dairy produce, Professor L says: "Healthy cows in good pastures give 800 to 900 gallons of milk in year." Aiton says "600 gallons a year may be deemed about an average this breed." And the author of "British Husbandry" says, in reference to t yield: "If equalled, we believe it will not be found excelled by any other bre in the kingdom." Martin says: "The milk of a good Ayrshire cow will affo 250 pounds of butter, or 500 pounds of cheese annually." Milburn's estim is, that cows of this breed will give from 600 to 800 gallons of milk in t course of the year, and as much as 260 pounds of butter. Haxton cites ma statistics, from which it appears that in one dairy of thirty cows the avera annual yield of milk was 632 gallons; that 9¼ quarts afforded a pound of b ter, amounting to an aggregate of 274 pounds in a year. He adds: "Fr these data, it appears that the milk of the Ayrshire breed of cows is not on abundant in quantity, but also rich in those substances which constitute exc lence of quality, and when with these qualities is considered the small amount food consumed, the result is so favorable to this breed that few thoroughly quainted with the subject will refuse to rank the Ayrshire cow among the m valuable for dairy purposes in the United Kingdom."

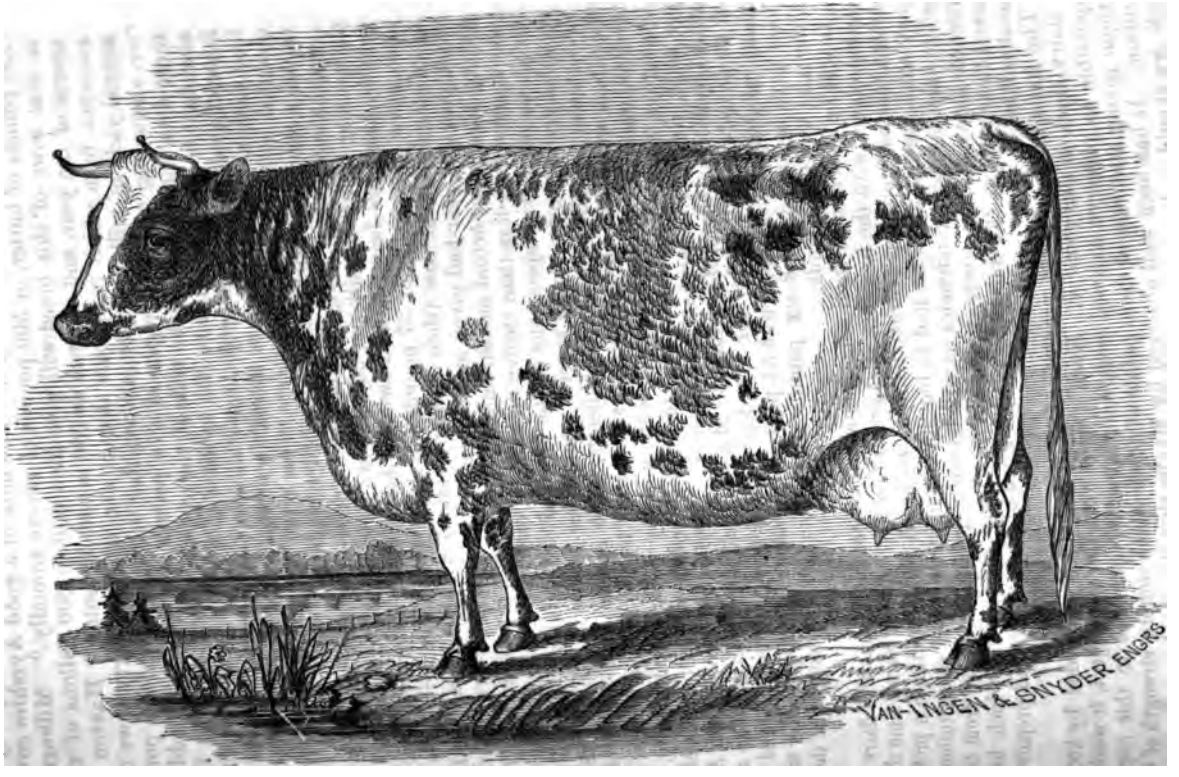
In the competition at Ayr in 1861, for a prize offered by the Duke of Ath the average weight of milk per day, for two days, from six cows, was about pounds, the cows being milked twice a day. The cow which took the fi prize gave an average of 57 pounds per day. On this occasion, the Duke Athol stated that the cow (then in his posession) which received the first pri of the previous year had given an average of upwards of twelve quarts of mi per day for a year, actual measurement having shown a product of 1,110½ g lons in something less than twelve months. Comparatively few accurate t have been made with specimens of the breed in this country. One of four i ported Ayrshire cows, owned several years since by the late J. P. Cushing, Watertown, now Belmont, Massachusetts, gave in one year 3,864 quarts milk, beer measure. One of the cows, imported by the Massachusetts Socie for Promoting Agriculture, in 1837, while kept by the late E. Phinney, esq., Lexington, Massachusetts, was said to have afforded sixteen pounds of but per week, for several weeks in succession. The imported cow, Jean Armo owned by H. H. Peters, of Southboro', Massachusetts, in 1862, gave an avera of 49 pounds of milk a day for 114 days, commencing June 1st; and for t month of July her average was 51 pounds 13 ounces per day. Her milk three days in July yielded six pounds of butter. Her live weight at the cl of the trial was 967 pounds.

It will be understood, from what has already been said, that the dairy is leading object with the breeders of Ayrshire cattle. At the same time the i portant fact has not been overlooked, that to breed and perpetuate a profita dairy stock regard must be had to hardiness and strength of constitution, a also to such fattening tendencies as will insure a profitable return from calv fattened for veal, from steers, reared for beef, and from cows, which, hav served their turn in the dairy, are at last dried of their milk and prepared the shambles.

The importance of these properties is not sufficiently regarded by keep of dairy stock in this country. Even if milk were the sole object, it would impossible to preserve a breed possessing superior qualities in this resp without giving attention to those points of form which denote strength of c stitution. It has been well observed by Magne that "in the breeding of d stock we should make choice only of animals possessing the *two-fold cha ter* of general vigor and activity of the mammary system."

These principles have been followed to a considerable extent by the lead breeders of Ayrshires in Scotland. Hence they claim a high rank for breed in reference to general usefulness. Aiton, in speaking of what

PLATE XXX.



MISS MILLER.

17 A

ow will do, says "she yields much milk, and that of an oily or buty-
r caseous nature, and after she has yielded very large quantities of
veral years she shall be as valuable for beef, as any other breed
nown; her fat shall be much more mixed through the flesh, and she
faster than any other."

er may be said in regard to the extent of these claims, it will be ad-
at they indicate the confidence which was long ago placed in the
egard to the properties mentioned.

who wrote twenty-five years after Aiton, says: "The breed has
improved since Mr. Aiton described it." It is upwards of thirty
e Mr. Youatt made this remark, and in this time the breed has been
r improved in reference to general usefulness.

unanimous testimony of the most experienced breeders in Scotland,
nothing has been lost on the score of dairy properties, considerable
ained in hardiness and thrift, and in the faculty of giving a greater
h in milk and flesh, for the food consumed.

mmon course in Scotland with calves of the Ayrshire breed that are
d for keeping up the dairy stock, is to fatten them for veal, or turn
eef at an early age. The larger portion perhaps of the males are
veal. In some districts the fattening of calves is an object of con-
mportance, and the superiority of Ayrshire cows for producing the
ty of veal is acknowledged. Thus Haxton observes, "for all
ils and climates throughout the United Kingdom, there is no breed
e Ayrshire for profit whether the produce is converted into cheese,
veal. Scotch farmers, who are in the practice of fattening stock of
eeds, state that Ayrshire steers at the age of three to three and a
fatten to as much profit as any, reaching the weight of 700 to 800
e four quarters, and affording beef excelled in quality only by the
hlanders and Galloways. The cow Ada, imported and owned by
ers, of Southboro,' Massachusetts, was slaughtered about the first of
3. Her dressed weight was as follows: beef, 882 pounds; tallow,
s; hide, 70 pounds; making a total of 1,009 pounds. The quality
f was pronounced by all who tried it superior to any they had
ed, being high-flavored, fine-grained, and well *marbled.* This cow
years old.

ils have yet been made with the Ayrshires in reference to fattening
ntry, as most of the males have been kept for bulls, and the females
m been turned for beef till too far advanced in years to breed. As
ne more numerous, however, the males will be more frequently cas-
their value for beef, and also for labor, will be ascertained. Some
f the stock are now rearing steers, with the intention of working
e yoke. There is no reason why Ayrshire oxen should not be equal
their size for labor. They are about the size of Devons, have clean
, well placed muscles, and are generally very quick walkers.

the earlier importations of Ayrshires into this country were those of
achusetts Society for Promoting Agriculture," about 1835 or 1836.
rted at this time was kept for one season or more in the neighbor-
sfield, Massachusetts. Mr. C. N. Bement, who then had a farm
nty of Albany, New York, and was breeding Short-horns, sent some
latter breed to the Ayrshire bull alluded to, and reared several
cross, with which he was so well pleased that he afterwards im-
ained some full-blood Ayrshires, which he kept and bred from for
finally disposing of the stock to E. P. Prentice, of Albany, New

" ssachusetts Society for Promoting Agriculture" made
mportation of Ayrshires, and in 1858 they imported ten

heifers and four bulls. These were subsequently sold by auction, with their progeny, and served to disseminate the blood very generally through Massachusetts. The late J. P. Cushing, of Watertown, Massachusetts, imported several Ayrshire cows and a bull about 1838. Near this time the late Captain Randall, of New Bedford, Massachusetts, commenced his importations, of which he made several, previous to 1844. Hon. Daniel Webster, also, imported some Ayrshires about 1840.

Mr. Ward, of Lenox, Massachusetts, imported several animals of this breed about 1840 to 1842, some of which were very fine specimens of the so-called Swinley family. These subsequently passed into the hands of Mr. Prentice, of Albany, New York, as did also a portion of the herd of Captain Randall; the best portion of Mr. Prentice's herd was purchased a few years since by William Birnie, of Springfield, Massachusetts. The late R. L. Colt, of New Jersey, Mr. Watson, of New York city, and others of that city and neighborhood, made various importations from 1844 to 1855, and, perhaps, later. The first importation of the fine stock known as that of Hungerford, Brodie & Co., Brodie & Campbell, &c., of Jefferson county, New York, was made in 1853.

H. H. Peters, of Southboro,' Massachusetts, made his first importation of Ayrshires, consisting of four heifers, in 1858; a further importation of twenty-one females and two males was made in 1859. This herd now numbers ninety animals, and is the largest of this breed in the country. Mr. Peters has bred with great care and judgment, of which his splendid herd is a full testimonial. He intends to pursue the course of English breeders, and have an annual sale of such stock as he can spare.

The prominent position which the Ayrshires are taking, particularly as a dairy stock, is indicated by the fact that a herd-book of Ayrshires was issued in 1863, under the auspices of the "Association of Breeders of Thoroughbred Neat Stock," (Henry A. Dyer, of Brooklyn, Connecticut, Secretary,) in which are recorded the pedigrees of seventy-nine males and two hundred and seventeen females, nearly all owned in New England. It is much desired that breeders from other sections of the country should send their stock for record.

HOGS AND PORK PACKING IN THE WEST.

BY H. D. EMERY, CHICAGO, ILLINOIS

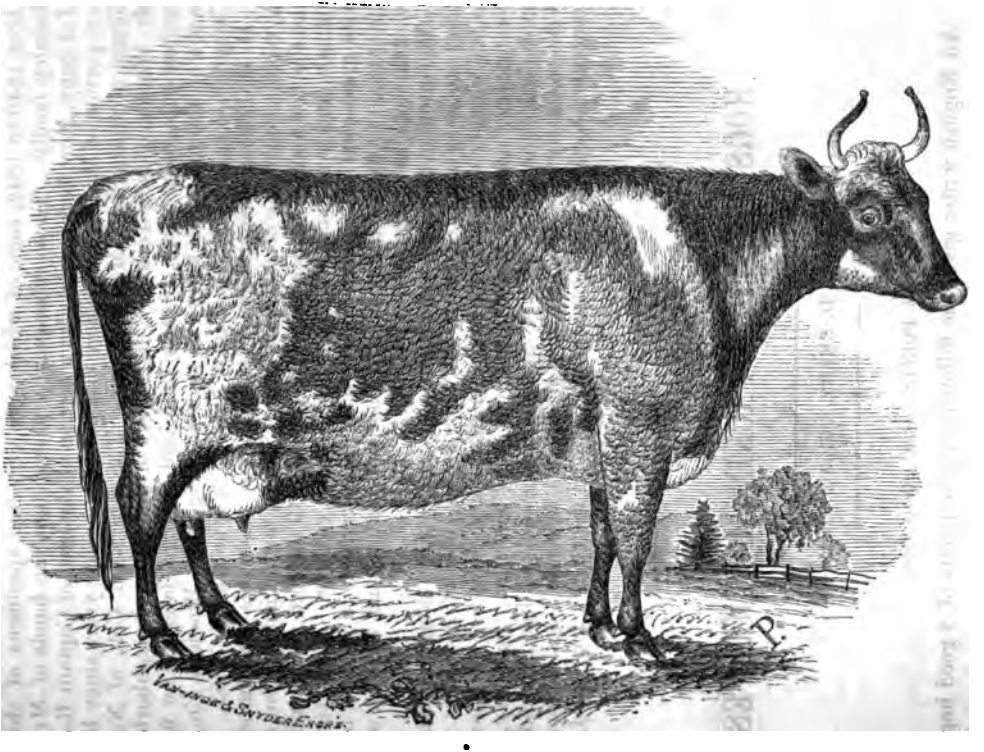
THE POINTS OF A GOOD HOG.

An English writer gives the following as the points of a good hog:

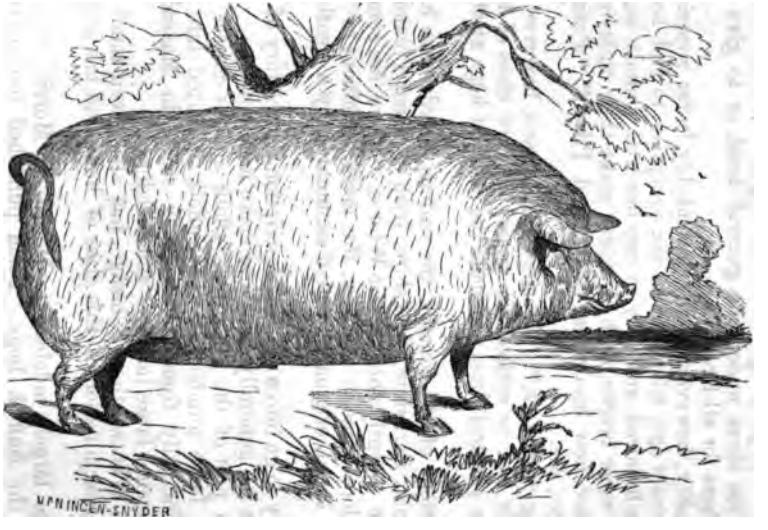
"Sufficient depth of carcass, and such an elongation of the body as will insure a sufficient lateral expansion. Let the loin and chest be broad. The breadth of the latter denotes good room for play of the lungs, and a consequent free and healthy circulation, essential to the thriving or fattening of any animal. The bone should be small and the joints fine. Nothing is more indicative of high breeding than this; and the legs should be no longer than, when fully fat, would just prevent the animal's body from trailing on the ground. The leg is the least profitable portion of the hog, and we require no more of it than is absolutely necessary for the rest.

"See that the feet be firm and sound, that the toes lie well together, and press straight upon the ground, as also that the claws are even, upright, and healthy. Many say that the form of the head is of little or no consequence, and that a good hog may have an ugly head, but I regard the head of all animals as one of the very principal points in which pure or high pure breeding will be most obviously indicated. A high-bred animal will invariably be fine

PLATE XXXI.



MISS DREW, 2d.



KEYSTONE.

Chester County Boar, owned by H. S. White, of Framingham, Mass.

speedily at maturity, to turn out more profitably, than one of questionable or and such being the case, I consider that the head of the hog is by no means verlooked by the purchaser. The description of head most likely to promise, a concomitant of high breeding, is one not carrying heavy bone, not too flat d, or possessing too long a snout. The snout should be short, and the fore- onvex, curving upward; and the ear should be, while pendulous, inclining ward, and at the same time light and thin. Nor should the buyer pass even f a pig. If this be dull, heavy, and dejected, reject him on suspicion of ill of some concealed disorder actually existing or just about to break forth; and e a more unfortunate symptom than a hang-down, slouching head. Of course, laughter, or a sow heavy with young, has not much sprightliness of deport-

BREEDS OF HOGS.

not uniformity enough in the variety or breeds of hogs grown in describe them under one general head, or to give any one the ver others for all locations.

ral quality, however, of the present day is far superior to that of hirty years ago, when it was the exception to find hogs in market er one hundred and fifty to two hundred pounds, and these were of the racer breeds, such as must make their mile in about three These are now known as the "Land Pikes," "Prairie Rooters," rs," &c., &c.

rprising "Suckers," "Hoosiers," &c., have, however, found that a er profit can be realized in raising a better class of hogs, such as in the shortest time, and make the heaviest hogs at about eighteen

ier sections of the country, the various breeds have had their run, Suffolk, Berkshire, Yorkshire, Irish Grazier, Poland, Essex, and d more recently the Chester Whites. There are some other hogs more local fame in the west, the most prominent of which is the gee breed, originated and disseminated by a gentleman of that o.

cessary to go into a general description and history of these various hey are too generally known to make it important.

rthern part of the State the Suffolk and its crosses predominate. been large numbers of the Suffolk imported into the west for rs, principally from the Stickney stock, in Massachusetts, Mr. ving been a large importer and breeder.

. John Wentworth, of Chicago, has also given much attention to and dissemination of this class of hogs, and has annually a large

is also largely indebted to Hon. L. G. Morris, of New York, for ts in the Suffolk hogs. From published foreign testimony the ds very high in England.

tral part of this State it is much more common to meet with the reed, either pure or crossed. In 1857 the Illinois Importing Asso- ght from England several head of Berkshires and others, which t high figures. The Berkshires have proved very prolific, and be- pular. One of the original pigs then brought over ("Siddington") and doing good service.

wing is a list of the swine brought over and the disposition made

BERKSHIRES—BOARS.

	Age.	Purchaser.	Price.
.....	1 year	W. D. Sanger	$200
.....	6 months	J. C. Crowder	40
.....	6 months	W. D. Sanger	35
.....18th,	7 months	Jesse Cloyd	200
.....19th,	7 months	E. B. Hitt	150

SOWS.

No. 1	11 months	J. C. Crowder
No. 2	10 months	Jos. Stockdale
No. 3	1 year	C. Bohnman
No. 4	11 months	J. H. Thomas

IRISH, CUMBERLAND, AND YORKSHIRE—BOARS.

Boyle	11 months	F. Stevenson
John	8 months	S. N. King
Pert	8 months	E. N. Tanter

SOWS.

No. 1	11 months	J. Stockdale
No. 2	11 months	E. B. Hitt
No. 3	12 months	J. G. Taylor
No. 4	12 months	L. P. Sanger
No. 5	12 months	James Hill
No. 6	8 months	E. B. Hitt

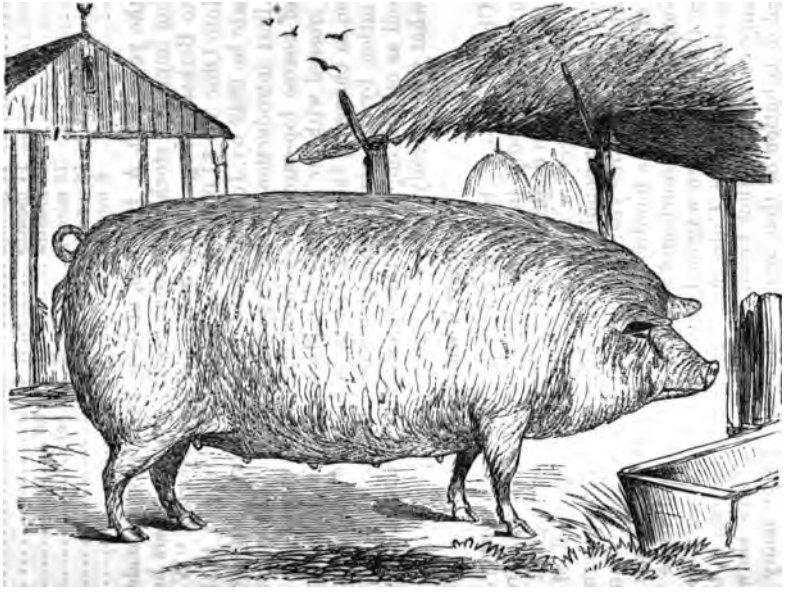
About the year 1840, A. B. Allen, of New York, gave considerable att to importing improved stock of various kinds; among others he paid attention to Berkshire hogs. One boar which he imported, "Windsor Ca was sold into Ohio for $1,000. From that stock, brought to the central of this State in 1842 by John Marhard, of Sangamon county, we are ind to the earliest introduction of the improved breed. There were some o old style of coarse lop-eared Berkshires there, then owned by J. C. Cro These he crossed with the stock of Mr. Marhard. But little more was do that section in changing the breed, except careful and judicious breeding, the importation by the association mentioned above, when both these g men, as well as others, improved the opportunity to obtain the stock for c ing with what they already had.

CHESTER WHITES.

The "Chester White" hogs, originating in Chester county, Pennsylv have been very generally introduced all over the west, and are very pop although there have no doubt been many frauds in sending out stock fro east for "pure Chesters" which were not such. Paschall Morris, of P delphia, one of the most popular and reliable breeders in eastern Pennsylv writes us that within three years past he has sent to Illinois, and States and west of it, about one hundred and seventy-five head, some of which gone to Kansas and Missouri, and even by the overland route into the te ries, where they have been wagoned one hundred or more miles. He ha sent to Mississippi, Liberia, Cuba, &c. Several other men in that region sent as many or more of that breed into the west. This shows somethi the general distribution of that breed. It is claimed by many not to be tinct breed. It is, however, probably as much so as many of the others has at least been known as such in the east for more than a quarter of a tury. These pigs have been sold at from twenty to thirty dollars a weaning age.

A gentleman of large experience in the northern part of the State (Whi county) says:

"I prefer the Chester Whites and Irish Graziers mixed, using the Chester boar, b they are better adapted to our northern climate than most other breeds. They are mo lific in breeding; their pigs are stronger when dropped. The sows are more motherly the pigs are very young; they seem to give a greater flow of milk for their young; th are less liable to the scurvy than the finer grades. At eighteen months old they wi duce a greater amount of pork to the same amount of feed than any other breeds that tried, when they can have a good clover pasture to graze in. They are more inclined t a good and regular appetite for food than most other hogs that I have tried. On the they prove to me a choice over all other breeds. I have been able to keep up a good of hogs of this cross, while finer breeds failed me in both number and weight of pork."



PENNSYLVANIA.

Chester County Sow, owned by K. S. White, of Framingham, Mass.

nother gentleman in Iowa says: The Chester Whites are his favorites, as y are pure white in color, have good coats of hair to stand our northern nate; and they will fatten at any age, are very quiet, not inclined to roam, l will fatten well in good clover pasture. They are great eaters, but grow idly. Half breeds of this class of hogs weigh well; three killed at the age thirteen months weighed respectively, net, 425, 415, and 348 pounds.

BERKSHIRES.

One of our best hog-raisers in Sangamon county, in giving his preferences r the Berkshire hog, says:

"Their flesh is better than the flesh of any other breed of hogs I have ever eaten; it is finer ed, tender and juicy, and when regularly fed is fit for market, or to kill and eat, at any m from four to eighteen months of age. The brood-sows are good nurses, and produce nerally from eight to ten pigs at a litter. They are very hardy, and less liable to disease n any other breed of hogs; and I have no doubt, from my experience in feeding and fat ning, they will make more pounds of pork on a given quantity of food than any other reed of hogs. The late J. C. Crowder said that he had no doubt that any sow, even the rriest scrub, bred to a Berkshire boar, would produce pigs worth two dollars a head more n any other stock. My own opinion is, they are worth at least one dollar a head more."

This is the testimony of but one or two; but they might be multiplied, giving this breed the preference; but we think, as before remarked, it is more confined to the central district of the State. The color (being black) is, with many, an objection—we imagine mostly of fancy.

SUFFOLKS.

There might be pages of testimony given in favor of Suffolks. Certain it is that when well kept and carefully cared for they produce pork which brings the best of prices in this market, and many choice lots are selected each year for the eastern markets, where they bring the highest price. We think it no exaggeration to say that we believe three-fourths of the hogs of northern Illinois have strains of Suffolk blood, and to their introduction may be attributed much of the improvement observable in years past. It is not uncommon to meet with lots averaging 400 pounds in weight, at eighteen months old; and when well cared for, and not kept too fat while young, very readily reach 300 pounds.

The pork of the Suffolk will almost always make "prime mess."

A gentleman in Will county, who raises and feeds a large number of hogs for the New York market, prefers the Berkshire crossed with the Irish Grazier, which latter in their native state are of about a rail's length, and require three or four years to come to maturity. By this cross he obtains a very uniform hog, which, at eighteen months' old, will average four hundred pounds, gross. His practice is not to wean spring pigs until September, and while at pasture feeds a small amount of corn daily during the whole season.

HOG RAISING.

But few of our largest *feeders* raise their own stock, preferring to pick them up as they can buy them, at weights ranging from one hundred to one hundred and fifty pounds, when they can do it at low rates, often buying in the Chicago market, and taking back into the country to feed.

The practice of the most successful breeders is to arrange to have the pigs in March or early in April. It is a usual custom with many to arrange for breeding of convenient size for two sows, placing them together, ut little bedding, keeping all clean and well ventilated; giving the sows and regular feed, especially after the pigs have been dropped; keep- together until about three to four months old, when the pigs are they having already learned to eat well aside from their mothers. e of some is not to wean at so early an age.

To prevent loss of pigs by overlaying, the best arrangement known is to provide the *two* sides of the pen, where the bed is arranged with a board or joist running along the sides about eight inches from the floor, and ten or twelve inches from the side of the pen. This gives a chance for the pigs to slide under it out of the way of being crushed. There is annually a large loss of pigs from overlaying, which might nearly all be avoided, if attention were given to this small matter. It is the custom in the summer to give hogs a range of pasture, some giving them the chance with other stock only, while the appreciating ones prepare a good clover pasture for their benefit, on which they do well without grain, though some feed sparingly of corn during the season of good pasturage, increasing the feed of corn until pasture fails, when they are forced ahead with all speed for the market, if the stock is to be marketed that fall. Old corn is found much more desirable and economical to feed to fattening hogs. Hogs while at pasture should be frequently *moderately* salted, say once a week, and have access to good water, but not to wallow in. In feeding corn, the feed should be only all they will eat up clean.

COOKED FEED.

There is no difference in the opinions of men who have thoroughly tried cooked corn feed for hogs while fattening. The *feed* goes further, and the hog will gain more rapidly on such feed, some careful feeders placing the saving at least 30 per cent. over corn fed in the ear. The advantage would not be so apparent, probably, were the hogs to have the range of a pasture, as the change of feed and exercise would secure a better digestion of dry corn. The recent inventions for cooking large quantities of feed at a small expense by the use of a portable steam boiler made for the purpose, which is very safe, has done much to encourage this method of feeding. The food to be cooked is placed in any convenient receptacle, such as a hogshead or tank made for the purpose, the steam to be conveyed to them through a flexible pipe, which is readily turned from one to another, as desired.

The same apparatus is very convenient at killing time for heating water and trying out lard.

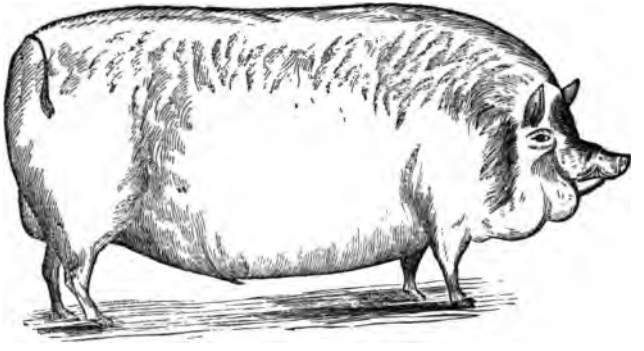
FIELD FEEDING.

In the large cattle feeding districts, where corn is usually to be found cheap, the practice is to have two *feeding lots* near the corn-fields, the corn is cut up and drawn to one of these yards, where the cattle feed for one day. The hogs (one to three, as the size and age may warrant for each head of neat stock) are then turned in to pick up and eat the corn scattered by the cattle, while the cattle are turned into the other feeding lot and fed with fresh corn from the field. Thus they are alternated until the cattle are turned off to the markets, which is generally some weeks previous to the hog market. The hogs are then put on *old* corn and pushed as fast as possible until ready for market. The practice with some is to let cattle and hogs run together; there is, however, much more danger of being trodden upon or injured by the cattle. The usual age for marketing hogs is from sixteen to twenty months.

DISTILLERY FEEDING.

This has been a favorite method of feeding hogs. They are usually picked up early in the spring at weights ranging from 100 to 150 pounds, and placed in pens, when the slop is conveyed to them in troughs while hot. It is not uncommon to confine them without ever removing them from the pens until taken to the slaughter-house. At other places where distilleries are situated contiguous to ranges, they are allowed the range of a pasture, where they obtain a change of feed.

Plate XXXIV.



LORD WENLOCK.

Since the prevalence of the hog cholera, which has at times raged so violently over many parts of the west, the distillers have found it very precarious business to feed them, as often half to three-fourths of a lot of hogs are swept off in a single season. At other times a very small per centum is lost from any cause. This method of feeding is then found very profitable. Hogs are usually kept at the distillery until October, when they are sent to market to give place to cattle, which are found much more profitable and safe to feed through the winter season. In this time hogs put in at 125 to 150 pounds will usually average from 275 to 300 pounds, some, of course, attaining very heavy weights.

The quality of pork made on still slops is not such as is suitable for packing, unless for immediate use, as it is very soft and juicy, neither does it bring as good a price as other pork for packing. The lard obtained is neither of as good and desirable quality as that from corn-fed hogs. The meat is said not to take salt well, it being so soft that the salt forms a kind of crust on the outside of the meat, leaving the inside fresh, which would soon cause it to taint and become rusty.

Considerable of this quality of pork finds its way to market during the warm weather, and is sold fresh from the butcher's stalls, it being in a good condition for market through the summer.

The hams of still-fed hogs, when carefully treated and cured, are considered superior for their rich and juicy character.

Still slops are the residue, after distillation, of corn, oats, rye, and barley, about seven-eighths of which is corn, the whole being mixed with water in the proportion of forty gallons to one bushel of grain.

PRICE OF CORN AND PORK.

From careful calculations made with Berkshire hogs, they have been found to gain two pounds per day for two months, (the usual time of feeding,) during which time they have consumed ten bushels of corn each. If the pork sells at at 5 cents per pound, this would give (say 60 days) 120 pounds gain, $6, which would be 60 cents per bushel for corn—certainly a good disposition to make of "ten-cent corn." From these data some idea can be formed when it would cease to be profitable to feed corn.

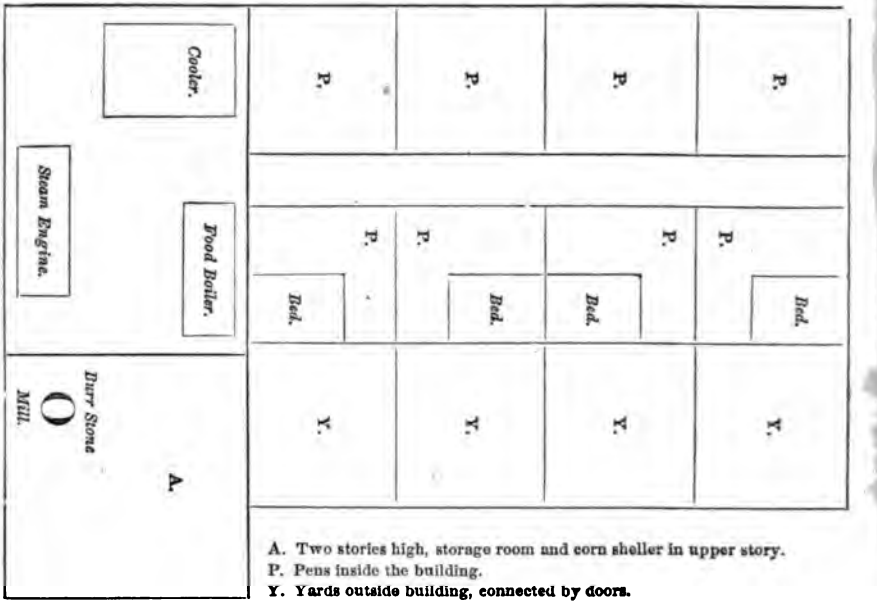
INDIVIDUAL PRACTICE.

We give annexed the practice and statistics of a gentleman in Ogle county who has had considerable practice in feeding hogs and been very successful. We give it in his own words:

"I raise the Chester Whites; they are very good. I can make hogs at eighteen months old average 350 pounds, live weight, without any difficulty. From what experience I have had with ground and cooked feed, I am satisfied it is preferable to whole corn by at least from three to four pounds of pork per bushel of corn. I do not, however, confine my hogs to cooked food entirely, as after they have eaten all they will of the cooked feed they will eat whole corn greedily. I have frequently fed them corn first, and after they had eaten what they would of it would eat heartily of the cooked food. Hogs do better to moderately salt their cooked food; they also eat it much more readily, and keep in better health. Since August last I have fattened 150 head, and have not had a sick hog to trouble me. In the summer I give my hogs the range of a fine grove near which I live. I would prefer to let pigs run with the mother until she weaned them herself, unless there was some special reason for doing otherwise. With good thrifty hogs, I am satisfied I can make fourteen pounds of pork from one bushel of corn, and, under favorable circumstances, more than that. I fattened a pen of hogs last spring, twelve in number, (not quite one year old when turned off,) that gained in weight over one hundred pounds each in seven weeks, the twelve weighing 3,610 pounds."

The annexed outline engraving gives the plan of pen and feed-house of the gentleman referred to. It forms an L, 65 by 91½ feet. The feeding-room, 36 by 70, divided into eight pens, with an alley through the middle lengthwise four and one-half feet wide; outside yards are arranged 16 feet wide, the same length of the pens inside, the passages to which are provided with doors to shut up in severe weather:

PLAN OF HOG HOUSE AND YARDS.



A. Two stories high, storage room and corn sheller in upper story.
P. Pens inside the building.
Y. Yards outside building, connected by doors.

One part of the L is built two stories high, with corn-sheller arranged for shelling, from which it is conducted to the mill below. The other part of the building contains the engine for driving the sheller and mill and furnishing the steam with which to cook the feed. The building is built of stone in a very substantial manner.

MARKETING HOGS.

The largest number of hogs are marketed on foot, and are generally transported from the nearest railroad station to the great packing centres of the country. A common way with railroad men is to prepare cars with double decks, one above the other, and thus providing for 50 to 75 hogs. This seems a more humane way than to crowd so many as would be necessary in one tier to load a car. In the height of the hog season in Chicago, in the neighborhood of the yards, it would sometimes seem as though we had almost got into a "hog heaven," for, turn which way you will, in the cars, in the yards, in the streets, all is hog, hog; and their cowardly pointed heads always turned earthward, running, grunting, squealing, and all showing a disposition to travel any way but the direction wanted.

During one single day the past season the astonishing number of 122,825 hogs were received in Chicago, and some enterprising statistician has figured them up in this wise:

"Allowing each hog to measure six feet, and all strung in one continuous line, they would form a hog-telegraph 14[illegible] miles long; and if each hog were made up into sausages and

SCAR.

Suffolk Sow, imported by Col. Lewis G. Morris, of Fordham, N. Y.

ether they would make 5,800 miles of "bolognas"—enough to girt the continent Francisco to New York, and give beside a small piece to grace the head of every l on the route."

w hogs are now driven any considerable distance on foot for a mar- uch the larger portion of the hogs received alive in Chicago are slaugh- re, while many of the better lots finds an eastern market, being shipped as before described, over the three great routes—the Michigan Central, n Southern, and the Pittsburg, Fort Wayne, and Chicago railroads tistics of receipts and shipments will be found in another part of this

ill also be seen by the annexed statistics, a large number of dressed e brought to market, killed and dressed by the farmers themselves, her consigned to commission men for a market, or sold from teams as in.

HOG TAMING.

hog in his natural state is a long, lean, cadaverous-looking animal, ap- as wild as when the herd "ran violently down a steep place into the Their noses are in the ground wherever they can be, and if perchance d their way into the lawn or pasture it is soon full of unsightly spots he turf is overturned. That they obtain anything from the earth of ue to them as food, compared to the injury they do, is not generally l, while it is known that they really consume considerable earth or hich by many is deemed decidedly injurious to a growing hog.

ous devices have been resorted to for many years to prevent their root- ringing them, some with a simple wire ring put through the centre e of the nose; some by cutting off the gristle or rim from the upper he nose with a knife or chisel; others by simply cutting the gristle or se in the centre, leaving it hanging at the two ends. This latter, when ne, seems to be the best of all ways, as in the winter it is not like a ring, accumulating frost and mud on the end of the nose to annoy and ne nose sore, neither is it ever in the way of eating. Hogs thus treated more peaceably inclined, seem in a great measure to loose their uneasy ing disposition, and never afterwards show any disposition to root, ly if the operation is performed when the pig will weigh 30 to 40 They rest more and take on fat better, and hence the term "hog " A simple instrument has been invented, somewhat resembling a shears in form, with a wooden block on one blade and a semi-circular the other. The shears are opened with the wooden block against the he snout, the blade brought down, and the work is done. The instru- known as "Hurd's hog-tamer." But any device which will prevent from rooting is very desirable, and nearly all good feeders practise the g" in some manner.

DISEASES.

y all the diseases to which hogs are liable are classed under one head masses, and called "cholera;" and the description of the disease and ms of the animals are almost as varied as the writers—due, in a great , to the want of sufficient knowledge of the anatomy of the hog, and is used, to give an intelligible idea of the disease. The most reliable ion of the hog cholera that has come under our observation was fur- in 1858, to the "Medico Chirurgical Review," by Dr. George Sutton, of Indiana, and is as follows:

hog at first appears weak, his head droops, and sometimes, in a few hours after mptoms, diarrhœa commences; there is frequently vomiting. In some cases the

discharges were serous and clay-colored, some ..loody and mucous, resem
bling those of dysentery. The urine at first w.. ..mall in quantity and high-col
ored, but, as the animal recovered, it becan .. and clear. This was one of th
symptoms by which the men who were atten .. hogs at the distillery ascertained tha
they were recovering. In a large number of cases the respiratory organs appeared to b
principally affected, and there was coughing, wheezing, and difficult respiration. In som
instances the animal lost the power of squealing, and the larynx was diseased. There wa
frequently swelling of the tongue and bleeding from the nose. In those cases, where th
respiratory organs were the principal seat of the disease, there was generally no diarrhœa
dysentery. In many instances the ear, or the side of the head, were very much inflamed
ear swollen to twice its usual thickness. This inflammation would spread along the skin,
times over the eye, producing complete blindness. Sometimes one or more legs wer..
flamed and swollen, and the inflammation also extended along the body. The skin where
was inflamed was red and swollen. Some had large sores on their flanks or sides from thr
to six inches in diameter. In one instance the foot became ulcerated and sloughed off. an
the animal recovered. Some appeared delirious, as if there was inflammation of the brai
Sudden changes of the weather, particularly from warm to cold, appeared to increase th
fatality of the disease."

The disease has of late been very wide-spread, and in many localities ha
been extremely destructive, so much so at times as to almost devastate son
large districts of hogs, the farmers turning their attention to other pursuits.

The treatment of the disease has been varied, and of course with varyin
results, without there being any settled course of practice pursued alike b
any considerable number of people.

As a preventive, Dr. G. W. Wallace, in the "Prairie Farmer," of July, 185
advised giving from five to twenty grains of calomel to a hog, two or thr
times a week, during the prevalence of the disease. He had thus been exem
from the cholera, while his neighbors lost a great number. His neighbors us
it, and the cholera disappeared.

A writer in the Country Gentleman has found a strong drench of alum-wat
effective, dissolving all the water would bear, and giving to them about o
pint each of the solution, and also giving to the lot (about one hundred hea
one pound of powdered alum in swill, fed each day for two weeks. Out of
lot of twenty-two affected head thus drenched, he lost five; of the remai
fifteen permanently recovered.

Dr. E. M. Snow, in the Agricultural Report for 1861, gives some valuab
suggestions relating to the treatment of this animal.

Prof. J. B. Turner, of Jacksonville, communicated the following cure, whi
has proved effectual with him:

"Take one peck of ashes, four pounds of salt, one pound of black antimony, seven p
of copperas, one pound of sulphur, a quarter or one-eighth pound of saltpetre, pound the in
dients fine and mix them well, and keep them constantly in a trough by itself, and each a
will eat what he needs of the medicine from day to day. If predisposed to cholera they w
eat it much more freely than if wholly well; and at such times the expense will be cons
able. If through any cause a hog get down, pour down him, or induce him to drink in a
one gill of coal-oil per day."

The wide-spread prevalence of the disease has attracted much attention f
the learned men of the land, without coming to any definite course of tre
ment to be pursued.

The best preventive is, most likely, to keep hogs from the filth they are
often allowed to indulge in, giving them regular and wholesome food, and g
pasture in season, and moderate salting.

There have, at various times, appeared individuals who claimed to have d
covered a specific cure for it, and holding it a secret while they petitio
State legislatures and Congress for aid or compensation by large appro
tions.

The latest of these men is one in our own State, Mr. G. W. Kinney,
Albion, Illinois, who has repeatedly presented the matter to our State Agri
tural Society's executive board and our State legislature, in order to get

appropriation, which he would deem compensation, when he would make his discovery public.

The State board last winter chose a committee to use his remedies, and report upon the same. We have no knowledge of their ever having made a report as yet. We have, however, learned from them something of the results. Captain James N. Brown, of Sangamon county, who was one of the committee, administered the medicine as prepared by Mr. Kinney to a lot of hogs, which were dying very rapidly. They at once began to improve rapidly, and soon lost all traces of the disease, which did not appear again for several months, and then slightly. The medicines again administered had the same effect.

At the last State fair, held at Decatur, we saw and conversed with several intelligent farmers who had purchased the privilege of using from Mr. Kinney, and had tried it with like results, and highly recommended the remedies.

Mr. Kinney's theory of the disease, as given by him before the executive board, is that the seat of the disease is at first in the lungs of the animal, the lungs of every diseased animal containing a knot of small worms. In the first stages of the disease he gives a medicine to be inhaled as the hog takes to food. In the third and last stage, other medicine is required to regulate the action of the bowels. Mr. Kinney stated that to the "undetective eye" it was difficult to discover the disease in what he calls the first two stages. The symptoms he describes as follows:

"The first thing to be noticed in the diseased hog is weakness in the eyes, the water flowing from them, together with the forming of dark spots under the eyes. In the second stage there is discoverable a slight shrinkage of the shoulder, something like that of the shoulder of a horse in case of sweeney, connected with slight coughing. In the third stage there is great thirst, a drawing up of the hindquarters, a sign of great weakness, and a refusal of food."

The third stage, Mr. Kinney asserts, is nearly identical with the first symptoms, as described by Dr. Snow, of Providence, Rhode Island, and is extremely difficult to overcome.

HISTORY OF PORK PACKING IN CHICAGO.

The history of Chicago as a centre of trade, in very many branches of industry, shows a progress without parallel in the annals of trade. Chicago now stands first among American cities in the amount of grain, lumber, and provision trade transacted here. Its natural location as the receiving and distributing point for both eastward and westward bound merchandise, together with the energy and enterprise which have been shown by its business men, have mutually contributed to this rapid development.

The earliest packing or slaughtering done here was as early as 1827, when Archibald Clybourn erected the first slaughter-house, for the especial purpose of supplying the garrison then at Fort Dearborn. But little was, however, done beyond the immediate consumption until in 1833, when the tide of emigration set westward quite strongly, creating a larger demand, and in such shape that it could be transported. During the fall of 1835 Mr. Clybourn packed about 3,000 hogs, besides considerable beef, for which a ready market was at hand. To obtain this stock it had to be picked up at long distances from Chicago, and was driven on foot to the city. About this time other enterprising men commenced to pack both pork and beef, the surplus of which found a market at the east.

Each succeeding year added more firms to this branch of business. The slaughter-houses were principally located upon the south branch of the Chicago river, it affording a sewer into which the offal and filth were freely poured, which, with the great increase of later years, has proved such a nuisance, and caused an edict to go out from the city fathers that it should be used as such

longer. Many of these l so l
e of the docks, and ship its ae v ex , nandi o.
v for rl ; they onn with a_ n
at their d s. There
rent c ... in Chicago doing a general cking business the
. The following table will show the h packed in the city
l seasons:

1853–'54	5
1854–'55	7
1855–'56	
1856–'57	7
1857–'58	9
1858–'59	18
1859–'60	16
1860–'61	23
1861–'62	51
1862–'63	97
1863–'64	90

The average yield of lard and weight of hogs packed during 1863–'4 follows:

Yield of lard	34 l
Average weight	192 p

The following table shows the number of hogs received and forward the respective years, including live and dressed:

Year.	Received.	Forw
1858	540,486	19
1859	271,204	11
1860	392,864	22
1861	675,902	
1862	1,348,890	49
1863, estimated	1,900,519	81

The receipts of hogs at Cincinnati, the next largest point to C series of years, are as follows:

1853	
1854	
1855	
1856	
857	
1	
1	
1	
18	

RK PACKING AT DUBUQUE, IOWA.

.....	12,585
.....	13,200
s, 1862–'3, pounds.....	229
s, 1863–'4, pounds.....	208
d from Dubuque without packing, in 1863–'4.	25,300

PACKING AT TERRE HAUTE, INDIANA.

d.....	49,674
.....	$176\frac{60}{100}$ pounds.
.....	$22\frac{69}{100}$ pounds.

in Louisville and around the Falls is estimated for the ng a falling off from the previous year of some 11,000

mated number received and packed is 200,000, which is 00 head from the previous year.
t other western packing points have fallen somewhat in

in number in the west has probably amounted to 20 per least 12 to 15 per cent. The decrease in lard will be were turned off unusually early, in light condition, as badly injured by early frost in August, and the high would not warrant putting it into pork.
he prices that have been paid in Chicago the first and th for live and dressed hogs during 1863:

	Live hogs.	Dressed hogs.
.....	$2 80 *a* $3 90	$3 85 *a* $4 40
.....	3 25 *a* 4 00	3 75 *a* 4 75
.....	3 55 *a* 4 40	4 15 *a* 5 00
.....	3 60 *a* 4 55	4 00 *a* 5 15
.....	3 65 *a* 4 85	4 40 *a* 5 75
.....	3 75 *a* 5 $12\frac{1}{2}$	.....
.....	2 00 *a* 4 75	.....
.....	3 50 *a* 4 95	.....
.....	3 75 *a* 4 25	.....
.....	3 00 *a* 4 $12\frac{1}{2}$	.....
.....	3 75 *a* 4 25	.....
.....	3 80 *a* 4 50	.....
.....	4 00 *a* 4 55	.....
.....	4 00 *a* 4 50	.....
.....	3 75 *a* 4 25	.....
.....	3 00 *a* 4 00	.....
.....	3 60 *a* 4 65	.....
.....	3 80 *a* 4 90	.....
.....	3 50 *a* 5 00	.....
.....	3 50 *a* 4 90	.....

The following table gives the current p) ...]
season of 1863–'64 :

Date.	Live hogs, gross.	Dressed hogs, net.	Mess pork.	Prime mess pork.
November 7, 1863	$3 25 a $4 80	$4 50 a $5 25	$15 25 a $15 50	$13 00 a $1
November 14, 1863	4 25 a 5 20	5 00 a 6 00	16 00 a 16 50	13 50 a 1
November 21, 1863	4 25 a 5 50	5 50 a 6 50	17 25 a 17 75	14 50 a 1
November 28, 1863	4 25 a 5 25	5 50 a 6 00	17 00 a 17 25	13 75 a 1
December 5, 1863	4 85 a 6 25	5 50 a 6 50	17 25 a 17 50	13 75 a 1
December 12, 1863	4 50 a 6 00	5 50 a 6 00	17 00 a 17 25	13 75 a 1
December 19, 1863	4 75 a 6 25	5 80 a 6 80	17 25 a 18 00	14 00 a 1
December 26, 1863	5 35 a 6 35	6 00 a 6 75	18 00 a 18 50	14 50 a 1
January 2, 1864	5 25 a 6 25	6 10 a 7 25	17 50 a 18 50	14 50 a 1
January 9, 1864	5 50 a 7 00	6 60 a 7 60	18 00 a 18 50	15 00 a
January 16, 1864	6 00 a 7 00	6 75 a 7 75	19 25 a 19 75	16 00 a
January 23, 1864	5 50 a 6 50	6 35 a 7 35	19 00 a 19 50	16 00 a
January 30, 1864	6 00 a 6 90	6 85 a 7 85	18 00 a 19 00	16 00 a
February 6, 1864	6 00 a 7 00	7 00 a 8 00	19 00 a 19 50	17 00 a
February 13, 1864	6 75 a 7 75	8 00 a 8 50	19 00 a 20 00	17 00 a
February 20, 1864	6 75 a 7 75	8 00 a 8 50	19 50 a 20 00	17 50 a
February 27, 1864	7 00 a 7 75	7 75 a 8 00	19 50 a 20 50	17 50 a
March 5, 1864	7 00 a 8 00	7 60 a 8 00	20 00 a 20 50	18 00 a
March 12, 1864	7 00 a 8 00	7 35 a 7 75	20 00 a 20 50	18 00 a

Date.	Prime lard.	No. 1 lard.	White grease.	Yellow grease.	Bulk meats.			Sugar pickled hams.	English meats.				
					Hams.	Sides.	Shoulders.		Short boneless.	Short middles.	Long boneless.	Long middles.	Cumberlands.
November 7,1 ...	10⅝	10½	9½	9	.....	.....	.....	.....	.....	.....	.....	.....	.....
November 14, ...	11½	10½	9½	9	8	7	5	.....	7	8½	8½	8	
November 21,1 ...	12	11½	9½	9½	8½	7½	5½	.....	9½	8½	.....	.....	
November ...	11½	11	9½	9	8½	7½	5½	.....	9½	8½	.....	.....	
December 5 ...	11⅝	11½	9⅝	9½	8½	8	5½	8½	9½	8½	.....	.....	
December 12 ...	11⅝	10½	9½	9	8½	7½	5½	8½	9	8½	8½	8	
December 19, ...	11½	11½	9½	9½	8½	7½	5½	9	9½	8½	.....	.....	
ember 26, ...	12	11½	9½	9½	9	8½	6	9½	9½	8½	9		
nuary 2,1 ...	12	11½	10	9½	9	8	6	9½	10½	9	.....	.....	
uary 9, ...	12½	12	10½	9½	9½	8½	6½	10	10½	9	.....	.....	
...	12½	12	10½	10	9½	8½	6½	10½	10½	9½	10	9	
Jan ...	12	11½	10½	9½	9½	9	6½	10½	10½	9½	.....	.....	
January 3 ..	12	11½	10½	9½	10	9	7	10½	10½	10	.....	.....	9
February 6, ...	12	11½	10½	9½	10	9	7	10½	10½	10	.....	...	
February 13. ...	12½	11½	10½	9½	10½	9½	7½	11	11		.....	...	
February ..		12	10½	9½	10½	9½	7½	11½	11		.....	...	
ruary 27, ...		11½	10½	9½	10½	9½	7½	11½	10½		.....	...	
5,1 ...		11½	10½	9½	10½	9½	7½	12	10½		.....	...	
en ...			10½	9½	10½	9½	7½	12	10½				

price for dressed hogs divides on those weighing 200 pounds, the lowest
eing for light ones, the others for heavy. The price of live hogs is
ed both by quality and supply and demand.

prices that have been paid for pork have, of course, varied with the
like all other articles of commerce. The earliest purchases made for
g in 1832 to 1834 varied from $2 to $3 per hundred net. To show the
of hogs in early days, contracts were sometimes made between pack-
l drovers for a lot of hogs, for which a given price was to be paid, the
average 150 pounds; for all that they averaged over that 1 cent per
was to be added, and all that they fell short 1 cent per pound was to
lucted. This was an incentive to produce heavy hogs, the contracts
made early in the season.

A MODEL PACKING-HOUSE.

give but one description, which will answer for a model one. Others
cording to the business to be done, but the general features are the
the classification of the meats are the same in all. In the one described,
ie grade of lard is made, in some there are two or three grades; the
of the hog producing lard being sorted out, making prime leaf lard, No.
, &c.

superior advantages presented by Chicago as a packing point have cen-
large amounts of capital here in the business, and the packing-houses
re among the wonders of this thriving city, from their completeness of
ement and the wonderful facility with which the business is conducted.
nnot give a better idea of it than to describe one of the largest and most
ete establishments, which has been erected during the year 1863 by
s. Jones & Culbertson, and at this writing is in full operation.

main building occupies a ground-room of 180 by 156 feet, with a lard-
35 by 156 feet joining, being separated by a heavy brick wall and iron
to prevent the steam and vapor from entering the main house. The
ng is three stories high, with nearly a flat roof, which is very heavy and
, perfectly tight, and divided off into yards or pens for receiving the
capable of holding four thousand head at once. The whole building is
ucted in the most thorough and substantial manner imaginable. The
floor is used for curing the meat and storing the material, the second
or packing and shipping, the third for cooling and cutting up the hogs.

advantages of having all animals for packing in a natural and healthy
when killed seem not to be generally understood, or at least but few
rs give the necessary attention to the condition of the animals when
to insure the best keeping condition to the meat. If an animal is killed
liately after hard exercise and excitement, as in driving to the slaughter
the flesh is in a high state of fever, the marrow is in a semi-fluid condi-
nd produces what is known as foul joints, and becomes in a short time
l and eventually spoiled. By the arrangement in the house under de-
on the hogs are driven up an incline to the top of the building, where
ave perfectly fresh air and good ventilation. They are allowed to re-
here two nights and a day before being killed, and they are then in the
ossible sanitary condition they can be.

METHOD OF KILLING.

en all is ready the hogs are driven, some twenty at once, into a small pen
fine grated floor. A man then enters, and, with a long handled hammer,
each hog a heavy blow on the forehead between the eyes, which instantly
him on the floor. After he has lain a few moments, another man enters
n with a sharp knife and sticks each hog, the blood flowing through the

floor, and being conducted by spouts to large t... this is being done another lot is let in ...ng pen and serv... same manner. The first l... b... ...g bled sufficiently, is slid... an inclined plane direct ...ding tub or vat, made of wood, some six feet wide, twenty feet long, and three feet deep, the water in which is heated by steam-pipes, and kept at a regular temperature; here they are floated along and turned by men at the sides until they reach the further end, where they are taken out of the tub by a simple contrivance, operated by a single man, and deposited upon the end of a long inclined table. Two men stand ready and take from the back in an instant all the bristles that are suitable for the brush-maker and cobbler, depositing them in boxes or barrels for removal. Other pairs of men, standing on opposite sides of the table, divest another part of the hog of its coat and so on through some eight or ten pairs of men, who each have a different part to perform in cleaning the hog, until it reaches the last pair, who put in the gambrel stick and swing it on a hook on an overhead railway, there it receives a shower bath of clean cold water, washing it clean from any particles of dirt that may remain, giving it, at the same time, a p... ...g scrape with knives. It then passes along to a man who opens it and r... ...ve the large intestines. It then passes to the second man, who takes out the intestines, heart, lights, &c.; the hog then receives a thorough drench of water, and passes to another man who splits the backbone down. They a... then taken from the hooks and borne away by overhead road-ways, and hun... up to cool, one man being enough to handle the largest hogs with ease. A... this point a man loosens up the leaf lard ready to be removed when cooled which, together with the splitting of the backbone before mentioned, helps very much to thoroughly cool the meat. The hogs are allowed to hang in the cooling-room, before being cut up, two days, when all animal heat is gone.

After the small intestines, &c., are removed from the hog, they are taken by men and boys, and all the fat separated from them and placed in large vats of water to wash it clean, going through two waters, when it is ready to go into the lard tank, which will be described hereafter.

THE CUTTING-UP PROCESS.

Having now got the hog ready for cutting up, he is taken from the cooling-room and carried to the room for this purpose, each hog being weighed as he is brought up, and his weight entered in a book kept for the purpose. Having been rolled on to the block, one blow from an immense cleaver severs the head from the body; another blow severs the saddle, that is, the hind parts, containing the hams; another lays it open at the back; another one for each leg; the leaf lard having already been loosened is now taken hold of with the hands, and instantly stripped out of the carcass. The remainder of the hog is then cut up according to the kind of meat it is most suitable for, the whole cutting-up process occupying but a few seconds of time, two smart men having cut over two thousand in less than eight hours. The usual day's work, however, at this ...ablishment is from 1,100 to 1,200 head.

THE LARD HOUSE.

... of this building we have given above. In the second ... ... iron tanks, made of heavy boiler iron, twelve feet l..., a... ...eet in dia... capable of sustaining a high pressure. Th... ex... ...ough ... ...hove into the third story, where each one pro... ea... ...a... ...ge m... ...ole... which the leaf lard, head, gut lard, and po... ...d, until the ... is full, when it is closed and the ... ...jet of steam f... he boilers, of a pressure of fifteen ... ...upplied w... ... valve, so that on reaching the

allowed, it passes off, causing a continuous flow of steam through the whole mass. By this process every particle of lard is set free from the mass.

One of the tanks is reserved for making *white grease*, into which the intestines, paunches, and all refuse from the slaughter-house are placed, and subjected to the same steam process.

Another tank is used for trying out dead hogs that are killed by accident, suffocation, &c., into which they are dumped whole, with the "pizzles" from the slaughter-house. The product of this is called *yellow grease*.

After the mass in the lard tanks has had steam on the necessary length of time, a faucet is opened midway of the tank, or about where the lard and water would meet, and the lard drawn off into an immense open iron tank, called a clarifier, with a concave bottom, provided with a steam-jacket on the bottom; here it is heated up to three hundred degrees Fahrenheit, sending all foul matters in a thick scum at the top, when it is skimmed off, all heavy matters of dirt, &c., settling on the bottom, this process thoroughly clarifying the lard. A faucet is then opened at the bottom, and the sediment allowed to run out until clear lard appears, when it is shut off, and the balance drawn into the coolers, thence into barrels, where it is weighed and branded pure lard, and the product is the purest article we have ever seen manufactured by any process, it being perfectly free from any unpleasant odor, and as pleasant to taste as new unsalted butter.

After the lard has been drawn from the tanks a large main hole is opened at the bottom, and the whole mass is drawn out in large wooden tanks set even with the floor. Here the mass is again subjected to a boiling heat, by steam-pipes laid around the inside; any remaining grease is thus set free, and rises to the top and is skimmed off. A plug is drawn, the water disappears into the sewer, and is soon mingled with the Chicago river. A gate is opened at the side, and the mass is turned out doors, ready to be carried off. Here you will find every bone that entered the tank whole and sound a bleached mass, so soft that even the teeth of the hog may be easily mashed between the fingers.

The bristles and hair are readily purchased by those who prepare hair for mattresses, "finding" dealers, &c. Thus everything that can be used is extracted, and but little of the original hog remains to be carried off as offal.

THE CURING ROOM.

This we have said occupies the lower floor. The first process is to dress all the meats, except the shoulders, with a solution of saltpetre, which is applied with a swab to the green meat, and while wet with it is covered and rubbed with salt, and then packed in tiers to cure. In three weeks it is all handled over and treated to a second dressing of salt, and again in seven days more, when it is pronounced cured. After lying a few days, the English meats (especially the Cumberlands) are taken and carefully scraped and smoothed off preparatory to packing. These meats are usually packed in square boxes containing 500 pounds.

The barrel meat is packed in the second story. Enough pieces of the various kinds are weighed out for a barrel, (200 pounds.) It is then packed in the barrels, a layer of meat, then salt, until filled, the whole headed up and branded. Each barrel is then filled with as much brine as the barrel will take, and allowed to stand with a small bung open a short time. More brine is added if need be, and the bung closed.

DESCRIPTION OF MEATS.

Mess pork is made of the sides of the thickest and fattest hogs, cut in strips six to seven inches wide, running from back to belly.

Mess O. pork (mess ordinary) is cut from th[illegible] a lighter class of hogs, ranging from 170 to 200 pounds, cut [illegible]ne manner.

Prime mess is cut from a still [illegible], ranging from 100 to 150 pounds weight, the shoulder being included. While on the block this class, after being divested of the head, saddle, and lard, is cut lengthwise about midway of the ribs, and then cut up cross-ways into 4 pound pieces, so that it takes just 50 of them to make a barrel. It is wonderful with what precision this work is done, the practice of the cleaver making it almost certain that each piece will weigh 4 pounds, or fifty pieces, 200 pounds.

The hams and shoulders are taken by the trimmers—the hams nicely rounded off and shaped; the shoulders the same—when they are dropped through a spout to the lower floor, as is all the other meat cut for curing. The heads, trimmings, leaf lard, gut lard, &c., are all gathered and taken to the lard-house.

ENGLISH MEATS.

Since the large demand for export has sprung up, packers have cut and cured their meats to suit the fancy of the purchasers, (the English style prevailing,) the following being the names and style of cutting and preparing:

Short-ribbed middles.—This is the side of the medium weight hog, (shoulder and ham off,) the back bone removed, and the ribs cracked through the middle.

Short clear is the same part cut from the best hogs, with back bone and all ribs taken out.

Long clear is the side, including the shoulder, with all bones removed.

Long rib is the same as above, with the shoulder and back bone out; ribs left in.

Cumberlands is the shoulder and side together, with back bone out: the shank cut short.

Stretfords.—Sides and shoulders together; the shoulder and bone taken out; shank left in; back bone and upper half of rib removed.

Long English hams is the whole hip, bone being left in, and the ham left the full size.

The feet generally go to the glue makers. Quantities, however, are prepared for eating by thoroughly cleaning and freeing from the toe nails; then thoroughly cooking and pickling in vinegar. In this way large numbers are disposed of, and are often served up at the hotels of the country, and are always found at eating saloons. Sutlers in the army also find a large sale for them among the soldiers, who consider them a great delicacy.

The tongues are packed in barrels, the same as mess pork, and always in demand, large quantities finding a foreign market. For home consumption they are prepared and pickled the same as the feet.

In the works described but one quality of lard is made. In other establishments various grades are established, the best being made from the leaf and trimmings; the second quality from heads and other parts of the hog yielding fat.

Lard oil is made by placing the lard in heavy duck bagging, and subjecting it to heavy pressure, the residuum being stearine, which is extensively manufactured into candles, they being considered very excellent.

CURING AND SMOKING HAMS.

The quality of smoked meat depends very much upon the curing of it previous to smoking.

The process of curing varies with different houses, some applying the saltpetre and salt, and packing in bulk to cure; while others prepare a pi[illegible]e (sweet pickle generally) by the use of three ounces of saltpetre, and o[illegible]two

f molasses for a tierce, the brine being made to show thirty degrees
ess by the meter.
the meat has lain sufficient time in the pickle, it is taken out and
in bulk for curing, or, which is better, hung up where it will not freeze,
g at least four weeks before thoroughly cured through.
moke-house should be built so that no meat shall ever come nearer
to twelve feet of the fire, and well ventilated at the top, to keep up a
culation to prevent the house becoming too hot. The fires are made
le or pit in the ground, and the material used (green hickory logs)
n it and fired somewhat like a coal pit, the wood being kept covered
uch with ashes. Care is taken that the temperature does not rise
5° or 70°. Corn cobs would be more desirable to use for smoking if
ld be obtained, as they impart a better flavor to the meat.
est weather to smoke meat is when it is clear and pleasant, and the
er rising. If the temperature out doors is about 50°, it is deemed
e. With such weather meat will make as much progress in a single
n several when the weather is damp and foggy. With good weather,
g day and night, one week's time is deemed sufficient to smoke hams

e meat is designed for shipment to foreign ports, it is seldom ever
but shipped packed in tierces, with salt, like other barrel meat, and
filled with the sweet pickle made as above described.

THE OFFAL.

the Chicago river has ceased to be the sewer for all the offal from the
r and packing-houses, the owners have been obliged to cart it off to
mons and open fields beyond the city limits at a very heavy expense

nterprising firm has, however, contracted with all the principal firms
ent season to carry it all away by the owners paying half the expenses.
however, of carrying it off and throwing away, they have commenced
g it for fertilizers. They have provided centrifugal machines, into
hey place the refuse from the lard and grease tanks, and throw out all
r, leaving only the solid parts, and that in a pulpy or pulverized con-
In this way they will prepare about three thousand tons the present
all of which will be shipped east for the manufacture of commercial
.
er concern is gathering all the bones it can pick up, from which are
tured large quantities of animal charcoal, and such as are not suitable
purpose are ground up and sent east, they having shipped the past
ver three hundred tons of ground bones alone. Thus the west is not
ding the people of the east, but feeding their lands.
should not be. Not one pound of this vast quantity of fertilizer should
allowed to leave the great prairies, for the time will surely come when
e needed.

THE GOAT.

BY ISRAEL S. DIEHL, LATE UNITED STATES CONSUL AT BATAVIA.

THE breeding and raising of goats has of late attracted considerable especially among the foreign and laboring classes of our country, as deve one of the most valuable domestic animals, particularly for its milking q at comparatively little cost; and producing good, cheap food when use milk; while with others the experiment is attracting still more atte arising from some new and valuable wool or fleece bearing varieties which been introduced and successfully acclimated and reared during the last f years. These are new varieties and uses of the goat in this country, th long and well known in Asia, even from the days of Moses, if not fro days of Adam; for by some naturalists the goat is considered one of the domestic animals of creation, and is mentioned by Moses and the early l lonian and Assyrian writers for its fine wool, from which the curtains o tabernacle and fine cloths and garments were early manufactured. Alth a great variety now exists throughout the world, nearly all reliable na maintain that they derive their parentage from the "*Capra Ægag* wild goat, that still exists in portions of Asia and the Alps of Euro næus, in his "*Systema Natura*," gives the common goat, "*Capra hircu* oriental origin, but seems to consider it a distinct species.

Cuvier, in both his editions, considers the "Paseng" *(C. Ægagrus)* the parent stock of all the varieties of the common domestic goat, and a inhabiting the mountains of Persia. Fisher also speaks of the "*Capra . grus*" as being the parent of our domestic goat; and as they have been d ticated for the uses of man for their flesh, fine skin, or wool, or milk, a nu of varieties have been originated or created equally varied in different cou as those of the horse, the sheep, or the cow. These varieties have b distinct and permanent in different localities according to their use, the locality or climate, and the attention given to them, and have thus bee may continue to be, preserved for ages without change or deteriorati desired, or may be increased in value and multiplied in numbers almost *ad itum*, as is now abundantly proven by the history of the past and the succ experiments of most stock-breeders and naturalists.

In the east, throughout Asia especially, the goat has constituted fro immemorial an important part of the flock, and been a source of wealth people; and thousands upon thousands of goats may be seen in tra through India, Persia, Turkey, and other portions of Asia, and some p Africa and Europe, more frequently being herded with the sheep of countries, in order to protect the latter from destruction by dogs, wolve jackals, as the goat is decidedly belligerent, not readily frightened or r away, but generally standing its ground, and on the defensive when as often offering battle, and pursuing the canine marauder beyond the bord the flock.

The Scinde goat, the Maltese, the Assyrian, the Syrian, the Sw other varieties, especially in Europe, have become most valuable milke for convenience and economy to the poor, or where feed is high and pas scarce, it has, in many places and instances, supplanted the cow, as it i about the house almost anywhere. Especially about towns, villages,

CASHMERE GOAT.

e are so many vacant lots and commons where they can browse on
of food and herbage, or that which is left or refused by the horse,
eep, is this the case.
t, in fact, is an indiscriminate feeder, cropping even poisonous plants
impunity and relish, as there are comparatively few plants or weeds
ther injurious or poisonous to it, and no herbage, leaves, or grasses
fect the quality of its milk, only rather to give it flavor; and in trav-
ugh Asia, Africa, and parts of Europe, it was quite common to have
rought to the door, tent, or camp, and milked for our use in our
whenever milk was required, giving us the assurance that the milk
ne as that of goats. It is much used both by travellers and fami-
specially by the inhabitants of the tropical, low, marshy, bilious,
countries as a preventive and cure for those and other diseases inci-
ch countries. The medicinal qualities of goat's milk have long been
l acknowledged, especially in the Old World, and in some portions
ntry, it being not only very wholesome, but less likely to curdle on
h; and by those who have tested the different kinds of milk it is
emed and preferred for tea and coffee, and is largely used for chil-
, the making of whey, and the various medicinal drinks for invalids,
at the various hospitals, watering places, and institutions of Europe,
of our own where it has been duly appreciated. It is also said to be
eficial to consumptives, dyspeptics, and other like invalids. Still an
unnatural prejudice has and does exist in the minds of many people
ntry against both the animal and the use of its milk, but without
reasons.
e varieties of the Asiatic goats have been largely introduced into
here they are quite extensively raised and used for the producing of
which the finest fabrics, shawls, worsteds, de laines, silk velvets,
fine articles are made, while from the milk, butter, cheese, and whey
to a considerable extent. They are not unfrequently harnessed to
ons or carts for marketing or pleasure purposes, or made to pack small
easts of burden. Their use and importance have thus become valua-
lispensable over large portions of Europe and Asia; but notwithstand-
es of these goats have been imported into the United States by emi-
people of this country for their own use, the animals have been sub-
neglected, mainly on account of the cheapness of cows and the easy
f pasturing them upon the extensive public domains, cheap pasture
ommons. But as the land has become occupied and more valuable,
se of purchasing and keeping cows has increased, and the value of
lk, and cheese is enhanced by the enlarged demand, the attention of
of our people, especially of the poor and laboring classes, has been
the breeding and keeping of goats; their milking qualities have been
proved, and their value so increased that we have recently seen com-
ng goats bought and sold at the price of an ordinary cow a few years
lv, from $10 to $25, and any ordinary milking goat is valued at $8
st of the milkers give from two to three quarts per day, especially
tethered, and milked three times daily.
J. S. Goe, at Brownsville, Pennsylvania, reports an Assyrian goat
n milking a gallon per day after the weaning of its kid. A sim-
now in the writer's possession, is reported to have yielded twenty
th of milk during the season, after selling two kids at three dollars
milk was mainly sold to physicians for patients at ten and twelve
t. A number of the famed Maltese milkers which we examined
yielded nearly the same results, and we have obtained ten
for some from our Maltese and Cashmere grades for medicinal
round the suburbs of our large cities, in many of the smaller

towns, in our coal and mineral regions, and along many of our public work great quantities of the common goat can be seen in use, while their value being materially enhanced by more attention to good breeding and valuab crosses. Among the most valuable milkers we have the Maltese, the Sw the Assyrian, the Syrian, the Scinde, the Spanish, and the Welsh goats.

Under many circumstances the goat is found more valuable than either shee or swine, as goats will live and thrive where they would starve; yielding l wool, kids, mutton, and skins. A good goat will yield milk nearly all the y or within a few weeks of parturition, if fed and cared for. The kids sh m allowed to suck two weeks and then sold, especially the buck kids. The g should then yield a quart of milk at each milking or meal, three times a say at 7 a. m., at noon, and at 7 or 8 p. m. About three months subsequent u parturition the supply of milk falls off to about two quarts daily, and contin so until within about three months of the next kidding, when it falls off to a one quart per day. The goat should be milked three times daily, in consequ of the want of capacity of her udder, for when the udder becomes charged wit milk, the goat lies down, ceases feeding, and no further secretion of milk take place; but relieve her by milking, and she again proceeds to feeding, an secretes a fresh supply of milk far more nutritious and nourishing, and easie of digestion, than that of the cow. It is not generally known that a goa tethered to a certain spot will yield more milk than when permitted to r s large without restraint, but such is nevertheless the fact. The tether sh be attached to a long pin driven into the ground, furnished with a swivel, i order that entanglement may be avoided, and shifted when a fresh supply o herbage may be obtained.

As goats are often disposed to be mischievous, and trespass upon forbi den property, either by climbing or creeping, a yoke may be made, co sisting of three pieces of wood put over the goat's neck, and fastened there a triangular form, which is found useful to prevent their getting through hedg or fences, while a side line, attaching the fore foot to the hind one of the sa side, prevents them climbing or leaping. With these two simple contrivanc a goat may be allowed to go anywhere without being able to enter a gard or field.

The goat is a cosmopolitan; he is found rambling amid the snows of No way and Siberia, and basking in the sun of Africa or under the equator Singapore, Java, Central or South America. Even the more delicate and fi wool-bearing varieties are found in the mountainous region and cold climate of t Himalayas, Thibet, and Russia, to the 60th degree of north latitude, feedi upon the scanty vegetation of that sterile soil, or luxuriating in the ferti vales of Cashmere, Persia, or Natolia. It is easily sustained and perhaps mo readily so than any other animal.

As the sheep follows the ox, feeding upon the gleanings, so the goat pro pers upon the scanty remains of vegetation left by the sheep, or on worn-ou neglected lands or fields, and in some places, as in Norway, feeding like t reindeer, upon simple moss.

The goat is less liable to disease than the sheep. It naturally attaches itse to man, and appears to be grateful for the very few favors it receives at h hands. The female commences breeding when from ten to eighteen mont old, and continues to breed till she is twelve, producing in temperate climat one, two, or three kids at a birth, and in warmer ones from two to five. H time of gestation is about five months. She may be milked fifteen days aft parturition, when the milk is sweet, nourishing, and medicinal, having agreeable aromatic flavor, no doubt imparted by the herbs and wild food which the goat feeds and delights to pasture; and this quality renders it pe liarly appropriate for the manufacture of cheese and butter, delicious spec of which we ate in Asia and Europe.

The suet of the goat makes candles superior in whiteness and firmness to those of the ox or sheep, while the skins of the goat are useful in the manufacture of morocco leather, parchment, and vellum; it being susceptible to a deeper, more perfect, and permanent dye than the skin of any other animal. In Turkey, Persia, and Africa, morocco leather is made from its skin in vast quantities, and is highly prized all over the world, while the skin of the kid is made into gloves of the finest quality, and always commands the highest prices. In Persia we observed it constituting the chief and most valuable article in the manufacture of the peculiar woolly kid and lamb-skin hats, so highly prized by the natives. Eighty thousand raw goat skins are annually exported from Norway for leather. Russia uses it largely. The horns are used for handles to tools of all kinds, while from the fleece are made various articles of clothing from the most luxuriant and costly shawl to the more humble and useful camlet and heavy durable clothing of the peasant. The goat is not only hardy and prolific, but long-lived, some attaining to the age of twenty-five years. Its flesh, as already asserted, is used for food, while that of the kid, especially with the crosses from the Angora and Cashmere, has been pronounced as being more delicious and delicate than that of the lamb or any fine venison.

There is, perhaps, more difference among goats than among any other class of animals, their milk varying both in quality and quantity, the latter from one pint to four quarts daily; and the following directions are laid down for selecting a good milker: Let the goat be of good size, the hair hard and stiff, the neck short, resembling that of the sheep, the head small and narrow about the muzzle, the eyes large and full; those destitute of horns are generally the best milkers; the color dark, or as nearly approaching to black as possible, avoiding light, yellow, or pied; legs straight and the joints even and firm. A goat is best at from three to six years old, but is useful till twelve years and older.

At the Cape of Good Hope large flocks of goats are kept, and they manifest extreme sagacity, needing no goatherd to watch them or lead them; and they are altogether wiser than the sheep. In the morning they sally out upon their foraging expedition, and in the evening they voluntarily return; and this applies to similar flocks we saw in Asia and Europe.

The goat is also said to be an excellent barometer, and able to foretell stormy weather, and always contrives to place himself under shelter before the advance of the storm if possible; they will run miles to evade or get out of a storm or avoid an undesirable rain.

There are at least forty distinct acknowledged varieties of the goat, the most valuable of which are the Angora, the Cashmere, the Thibetian, the Rhingis, the Kirman, and an equally fine species along the Caspian, Ural, and Black seas, and the black goat of Nepaul, all of which produce the finest wool fleece or hair in the world, and will readily cross with the common goat, producing a new and valuable acclimated variety in this country. The Scinde and the Syrian goats are noticeable for their extremely long ears, often twenty-two inches in length, and touching and dragging on the ground. The Assyrian, Spanish, and a few other goats are mostly destitute of horns, while the goat of India and Thibet is celebrated for its large and exquisitely twisted horns, much resembling the Wallachian sheep.

The *Capra Americana*, or Rocky Mountain goat, is a beautiful large white
i biting the Rocky mountains, the headwaters of the Missouri and
ue rivers, the Pacific coast range of mountains, especially around the
and sides of Mounts Rainier, Hood, Baker, and the vast buttes all along
as high north as Mount St. Elias.

ful stuffed specimen of this goat is now in the Smithsonian Institu-
well described by Professor S. F. Baird in the Agricultural Report

of 1851, and hence requires no notice here beyond the remark that it appears to be a fine wool-bearing animal with a double coat or fleece, and is closely allied to the Cashmere or Thibetian goat, and would no doubt prove as valuable if captured and domesticated. Efforts are now being made to obtain live specimens to domesticate and breed with the Cashmere, Angora, and common goat, when we shall no doubt obtain more valuable information of their habits, fleece, and value.

With so much on the goat, its qualities, characteristics, and a few of its varieties, and commending its consideration and culture to such as are circumstanced to render its keeping convenient and profitable, we next proceed to notice the still more valuable and wool-bearing varieties known as the Cashmere and Angora goats.

THE WOOL-BEARING GOAT.

As in several of its varieties the common goat *(Capra hircus)* has become a valuable domestic milk-producing animal, so has it also in several of its varieties become a most valuable wool or fleece bearing one, even from remote antiquity. Of this we have the earliest and most satisfactory evidence from the records of the ancient Babylonians and Assyrians, whose kings and priests were clad in the fine fabrics made of this wool. The magnificent robe in which the Nimroud monarch is represented as arrayed when receiving the sacred cup from the priests was of this fine fabric, for on no other material less delicate could those elaborate symbolical figures and mythological scenes have been portrayed with such minute correctness and beauty. Moses, in the Pentateuch speaks of the fine wool of the goats, or "goat's hair;" and no doubt this was the article from which the curtains of the tabernacle were made, with priestly robes and other fine articles of the Temple, as well as constituting the finer garments of the patriarchs and rulers of that day, as of the shahs, sheiks, pachas, and wealthier inhabitants of the present day. In the eastern world their extensive flocks are largely composed of these wool-bearing goats, constituting a source of wealth from time immemorial, and producing articles of manufacture and furnishing employment to the inhabitants. This fine-haired or woolled breed of goats we find exists under many varieties and in different latitudes and countries throughout Asia and parts of Europe, from Kirman, Persia, on the 30th degree of north latitude, to Tartary and Siberia, on the 60th degree, and from Mongolia, China, on the east, to Tartary, Cashmere, the Caspian sea, Asia Minor, and the Mediterranean, on the west. At Kirma and Teheran, Persia, most splendid shawls, fabrics, carpets, &c., are made, vieing in beauty, fineness, and value with those of Cashmere itself; while from Nepaul to Caboul, Teheran, Angora, and Constantinople, similar animals are found and similar articles of manufacture are made.

Various attempts, with varying success, have of late years been made to introduce these valuable wool-bearing animals into Europe, especially France, England, and Sweden, and lately into our own country; and by reference to the journals of the Society of Acclimation, *("Société Imperial d' Acclimation,")* we find extended and valuable accounts, but too lengthy for quotation or insertion here. Suffice it to say, the French government has considered these animals, their introduction and rearing, of sufficient importance to spend thousands of dollars upon the experiment; and we saw some fine specimens of these, both Cashmere, Angora, and other goats, in the *"Jardin des Plants,"* the zoological gardens of Paris, and at other localities in France, and are assured that they have finally succeeded in crossing the Cashmere and other goats and procuring a valuable wool-bearing animal, from which they get a long, fine, silky fleece and valuable wool, which they now manufacture into the finest and most costly shawls, velvets, worsteds, de laines, challis, threads, &c., heretofore known. The shawls are said to equal the celebrated ones

it is in the French works we find the most valuable re-
periences on this subject.

s Natural History, (German,) figs. 212—215, there are four good
rcus capra pillosa, the rough-haired domestic goat, the Cashmere,
which the Cashmere is represented with a black neck and a
ght, round, pointed horns, long coarse white hair, tail six
while the Thibetian goat is represented with a long smooth neck, a
hornless, short hair, with an immense udder, indicative of a good
a fine fleece-bearing animal. These, with other descriptions,
with what we saw of Cashmeres both in Asia and Europe, and dif-
or resembling in but few respects, what are called Cashmeres
; and by simple reference to the plates, the description, and a
animals, the difference is quite apparent. Thus we have valuable
of these goats in the New American Cyclopedia; in the Penny
's Cyclopedia, vol. 5, plates, a fine plate of Cashmere and
Natural History; the Farmer's Library, vol. 2, page 261;
Library, page 108, plate 9; in the Naturalist's Miscellany, vol. 8,
Cashmere; in Professor Low's Domesticated Animals of the Brit-
; in Goodrich's Animated Nature and in the Agricultural
1855, two plates of the so-called Cashmere, but plainly and evidently
while similar views are found in other English, French, and Ger-
ted; but these suffice for reference, while our personal ob-
examinations of flocks, animals, and testimony before us, both
Europe, and at home, furnish us further facts.

THE CASHMERE AND THIBETIAN GOAT.

y of the wool-bearing or "shawl goat," as it is often called, and
we herewith present a good illustration, is spread over Thibet, North-
and the regions to the east of the Caspian sea. It is somewhat smaller
common and Angora goat; it has straight, round, pointed horns,
ears, is covered with straight and falling, long, fine, flat, silky hair,
undercoat in winter of a delicate greenish wool, of but two to three
each, which latter alone constitutes the fabric from which the cele-
ls are made. Ten goats only furnish wool enough for a shawl one
a half square; but even this is often found differing both in color and
y of the wool, or rather the fine hair of which the fleece is composed.
ipal points in the most approved breeds are large ears, the limbs slender
ly formed, the *horns not spirally twisted*, and, above all, the fleece
straight, fleecy, and white.

the true Cashmere and Thibetian breed from which originally the
Cashmere shawls were made, there are several others which have
ed for the same purpose in different parts of Thibet, India, and
The Tartar half-breed has been found to survive well in a colder
been introduced into France with considerable success, as also
Ghengis and Caspian.

still most in request, however, are brought from the Kuyam of
e 16,000 looms are constantly at work, employing three men to
uring and disposing of thirty thousand shawls annually.

speaking of this goat, alludes to it as "a variety of the common
known as shawl goat, of Thibet and Cashmere, and they are
its relative, the goat of Angora." "From earliest time the
wn of this goat has been used in the manufacture of tissues
lly in Eastern Europe and Western Asia."

goat, to judge from the specimens we have seen,
Thibetian and Angora breeds, having long hair, wi

a fine undercoat like the former, but neither so abundant nor so fine as th Angora. In ancient times, when the goat divided the palm of usefulness wit the sheep, the Syrian goat was no doubt superior to what we now find it i Palestine or Syria, so far as its hairy produce is concerned.

The following description is given from Sharp's London Magazine:

"The Cashmere goat is a nobler species of the common goat, descended from the g Thibet, which pastures on the Himalaya. The climate is subject to sudden cha There is little rain, but much snow, as the cold in winter is below the freezing point. T is situated at the northern descent of the Himalayas, and Cashmere of the southern; hence the latter is a little warmer than Thibet. Here the goat is a domestic animal. It is no allowed a very luxuriant pasture. The soil is sterile, and vegetation scanty.

"The favorite food of these animals is buds, aromatic plants, rue, and heath. The peopl of Thibet always give them salt at least once a week, which has always proved a useful ac companiment to their customary food.

"The head of the Asiatic goat is large, the horns situated backwards and somew curved, the legs slender. Proper food and careful tending increases the fineness of the w

"The goats of Thibet which pasture in the highest lands have a bright ochre color. lower-grounds the color becomes of a yellowish white, and still lower or further down entirely white.

"The highest mountains here inhabitable by man contain, also, a certain kind of goa with black wool, which in India obtains the highest price.

"The goats of Cashmere and Thibet have the fine curled wool close to the skin, just as th under hair of the common goat lies below the coarse upper hair.

"The wool is shorn or pulled shortly before the warm season, the time when the anim naturally seeks thorns and hedges to free itself from the burden of its warm covering. A the hard and long hairs are carefully picked out. The wool, thus prepared, is first washe in a warm solution of potash, and afterwards in cold water, in which process felting must b carefully avoided. It is then bleached upon the grass and carded for spinning, and thre times dyed to impart to it its brilliant lustre."

THE ANGORA GOAT.

The Angora goat, so-called from a province of Natolia or Anatolia, the an cient Cappadocia, in Asia Minor, and the principal place where the wool bought, sold, and manufactured, has finally, like Cashmere, given its name t the goat inhabiting a large region of country extending from the Black sea o the north to Diarbekir, on the plains of Mesopotamia, on the south, and fro Persia and the Caspian sea on the east to near the Mediterranean on the w of which Angora forms the centre. This goat, though described as the *Capr Angoraensis*, is only an improved variety of the "*Capra hircus*," or comm domestic goat, and is closely allied in many respects to the Cashmere, b readily distinguished from the common goat by the greater size of its ears.

The Angora goat, and more especially the varieties it has produced, a probably the most valuable of all the goat family, and have been ably d scribed by naturalists, Buffon, Pennant, Hazelquist, and travellers, as good-siz animals, generally of a beautifully milk-white color, with short legs and wid spreading, spirally twisted horns, a good view or illustration of which is her with presented, and may be readily recognized either in the pictures heretofo published in this country under the name of Cashmere, or by reference to t authorities quoted, or a simple view of the animals themselves, now scat throughout most of the States from Massachusetts to California.

The wool is described as "a very beautiful curled or wavy hair, of sil whiteness, with a fine downy wool at its base," and this hair is disposed in lo pendant spiral ringlets on the whole body. The horns of the female, of spreading as in the male, turn backwards, and are much shorter in prop tion; those of the male are long, spirally twisted, but the size and direction very different from the common goat, being generally extended from fi to thirty inches in height on each side of the head, while those of the f end near the ears. The hair or wool often sweeps to the ground, and is five to twelve inches long, especially in the older bucks, but then not

The fleece of the ewe shears from three to five pounds, and that of the buck fr five to nine. The tail is shorter than that of the Cashmere, and usually d erect. "These goats have the hair very long, thick, and so fine that have been made of it almost as handsome and glossy as our silks, and e been known under the various names of cashmeres, camlets," &c. This f description will apply to almost all we saw in Western Asia, Europe, and m d ntry, (say of several thousands,) save some difference in the ears; for e ny have the pendent ears, others we examined have ears exceeding ali and short.

neece in some is longer, more curly, pendent, and wavy than in others. T oundary for these goats is set in Asia Minor, from which the natives say it en they will deteriorate or lose much of their beauty, which, however, been disproved by successful experiments, both in France and in the un . States. They are there generally accustomed to high, dry land, the f part of Natolia consisting of dry, chalky hills, on which there are rather than trees, or else of valleys, lying from 1,500 to 2,000 feet ve the level of the sea, which, however, are quite bare of trees, and but ily covered with grass. Even in this expanse there are spots that profiner flocks than others, where the goats are mostly kept on hills, the es attributing a general superiority to mountain flocks which have a rare sphere, more feed, and a larger choice of herbs; and, ranging widely, are in good health, on which the quality of their fleece mainly depends.

roving tribes are said to keep their flocks out day and night, summer and winter, (except when an unusual quantity of snow falls,) so that they do not soil their fleeces by folding them. They are mostly kept on fresh food in winter by shepherds leading them down and up the mountain sides as the snow and grass appears and disappears, while the flocks of the valleys must be fed on hay or branches.

The fleece of the white Angora is called "tiftick," and is clipped annually, that of the yearlings and females being more valuable than that of the males, and is here manufactured into the most delicate articles.

A curious statement was made to us at Angora, that only the white goats which have horns wear their fleece in long curly locks, which are so much admired, while the hornless ones have a comparatively close coat. The finer the fleece the more readily and naturally it curls, while the fleece is made or kept finer by carefully washing or combing out all impurities, thus giving it a polish.

There is also a second or other variety of Angora or shawl-wool goat beside those generally described. This goat has an unchanging outer cover of long, coarse hair, between the roots of which comes in winter an undercoat of downy wool that is naturally thrown off in spring, or is carefully combed out for use. A remarkably fine species of this breed exists throughout the area to which the white-haired goat is limited, and similar breeds prevail all over the highlands of Turkish and Persian Armenia, Koordistan, and at Kirman; and, although some flocks yield finer fleeces than others, it is called the same wool or underdown as the wool of Cashmere and Thibet, and samples of the wool of the Thibetian and the double-wooled goat of the banks of the Euxine show them to be but varieties of the same species.

This goat is of a larger size than those of the more southern Turkish provinces, and its wool finer, and is probably the variety introduced by Dr. Davis from Asia Minor as the Cashmere, and now erroneously so-called throughout the country, as all the importations to this country, as far as we can learn, were shipped from ports on the Mediterranean or Constantinople, several thousand miles from Cashmere or Thibet, through inhospitable and almost untravelled countries for Europeans, which goes far to prove the so-called "Cashmere goat" to be the Angora.

This double-coated race of goats in these Turkish and Persian districts is also colored black, brown, golden, light dun, grey, and piebald. The colors of the two goats do not necessarily correspond, black hair commonly overlaying brown wool; others differ more or less in depth of shade. Goats of this breed are sometimes mixed with the white-haired goats, especially when a remarkable flock-leader is desired.

The articles of clothing woven and knit from this wool seem to combine in a great degree the qualities which are so much desired in shawls, viz: lightness, softness, and warmth.

So much, briefly, for the goats of Angora. We shall now consider their introduction, adaptation, and value to this country.

INTRODUCTION OF THESE GOATS INTO THE UNITED STATES.

Various attempts have been made to introduce and breed this fine wool-bearing goat into France, England, and Sweden, with only partial success, however, until of late a very valuable cross between the Cashmere, Angora, and common goat has been obtained, producing an acclimated, fine-fleeced animal, from the wool of which some of the finest shawls, velvets, cloths, worsted, and de laines are now manufactured in France and England.

In the Reports of the "Societe Imperial d'Acclimation" full and interesting descriptions are given of the various reported flocks in France and Europe from 1787 to the beautiful flock presented by Abd el Kader to the Emperor, the care of which has been made a national affair. Nothing of interest to the world in their habits, progress, or success has been lost; and of all her industrial pursuits France has considered this of prime importance, and to no other animal has she given more exclusive attention, with the hope of obtaining a possessing the "golden fleece," and upon no other has there been more cussion in the different scientific societies, her naturalists and scientific m always taking the lead until remunerative success has rewarded their expendi tures and labors. Some of these improved specimens we had the pleasure o seeing in France, and can bear testimony to their beauty. In England an Sweden, by the last reports, success was attending those experimenting in th Angora crosses, and good results anticipated.

Nowhere, however, has their introduction and breeding been attended wit the same cheering results and decided success as in our own country, and th after thorough toil and practical experiments during the last fifteen year when seven were first imported by Dr. Davis into South Carolina. Since th some three hundred head have been imported from Angora at various tim and seasons, *via* Constantinople and Boston, mainly for the south and sout west, from which, with their crosses, a numerous progeny and various sma flocks have descended, now numbering several thousands, and scattered fro Massachusetts to California, yet still mainly confined to the southweste States in flocks of from twelve to three hundred, and more, as at Atlant Georgia; Gallatin and Nashville, Tennessee; Russellville, Frankfort, Pa and Georgetown, Kentucky; Greenville, Lebanon, Montgomery, and Bucyr Ohio; Green county, Indiana; Chicago, Decatur, and Evanston, Illinois; S Louis, Maramec, and Fayette, Missouri; Baltimore, Maryland; Leavenwort Kansas; Brownsville, Pittsburg, Washington, and Philadelphia, Pennsylvani New York; Boston, Belmont, Massachusetts; Austin, Texas; Iowa, Michig Minnesota, and California, with other localities, where they have been th roughly tried, prospered, and improved.

We have either personally visited and examined most of the above-nam localities and flocks, seen or obtained animals or specimens of the wool, co paring them with what we saw abroad and the best specimens of wool to obtained from abroad, or the best imported ones, and are well satisfi

d that we have succeeded, and can continue to succeed, in
wool-bearing animal, with its precious fleece, almost any-
country where sheep will prosper, especially in the
alities, producing an animal more hardy, with a heavier
ece, than the Angora or Cashmere itself in its own coun-
s of wool in our possession, and raised in this country, are
re silky and fleecy than the imported and original ones.
wever, from eminent and successful breeders may prove
to practical men.

. Scott, an extensive farmer and stock-raiser at Frankfort,

s:

k of eighty head, of all grades from half-bloods to pure breeds, and there is
y one among them, and few if any that are not fat enough for mutton.
in winter, is obtained exclusively in the pastures, and they are so fond of
and briers, that they will eat them chiefly if they are accessible, and in this
in cleaning our fields and pastures of noxious weeds and shrubs. In win-
given them on a blue-grass pasture; and grain, though greedily eaten by
ired either for health or condition. So far I have found them entirely free
ng like it having appeared in the flock except an occasional humor in the
which yields readily to the application of turpentine or bluestone. A pecu-
as sometimes infested them in spring, requiring the application of flour of
along the spine and in spots about the skin of the body.
I think is necessary for them, as they dislike to be in the rain even in
they almost invariably seek their shelter at night, and during storms,
are of a shepherd.
und them not only healthy but prolific, the females doubling their number each
e ewes are more prolific than full bloods, or pure breeds, the former frequently
latter only one. They do not attain their growth until two years old.
uicy, and high-flavored, resembling that of the sheep more than any

will weigh from sixty to eighty pounds, yielding from ten to twenty pounds
firm tallow. The saddles, both cold and hot, are regarded as the highest
kind. The wool of the same bloods differs slightly, but there is no material
pure breeds and full bloods, the full bloods being five or more crosses on
go by a pure bred buck.
wo or three months of summer they all wear a covering of coarse short hair,
drops out gradually, giving place to the fine wool which attains its growth by
t should be shorn after the cold weather has passed, and before the coarse hair
grow into the fleece. The dressed skins are valuable and in demand for ladies'
robes, saddle covers, and cradle spreads; the furs of some animals exceeding
ers, but few equalling them in silky richness and glossiness of texture. The
rec various dyes with great facility.
k out one hundred full bloods, assured by the experience so far that they
eep in value of their fleece, which is from four to eight pounds in weight

•

hn Walker, of Fayette, Missouri, a distinguished farmer and stock-
has a very superior flock of about seventy head, says:

d most of them in this State, and so far they have done remarkably well. They
weather of this winter better than other stock we have. They are very hardy,
apidly. The does take great care of their young. The cost of keeping these
any other animal. They graze upon coarse herbs that are not eaten by any
as iron weed, dock, mullen, briers, buds, and broken sprouts. Their wool
st felting qualities. My buck sheared nine pounds and three-quarters, and
five pounds."

illiamson, of Gallatin, Tennessee, agent of the "Sumner Cash-
" and who has a large and valuable flock, has published an ex-
t of 36 pages on the goat, detailing much valuable information
of breeding them, but substantially the same as that already
by letter, that so great has been his success in breeding and
l their crosses, "that during 1858 we disposed of twenty-

seven thousand dollars' worth, and with an increased success until the war commenced."

Brigadier General E. A. Paine, commanding the United States forces at Gallatin, Tennessee, says:

"I have been stationed at this post nearly eighteen months, and have been deeply interested in making myself perfectly acquainted with the habits, increase, and value of these animals, and am thoroughly satisfied that the Cashmere wool is to be one of the greatest staples of the country. It is to be to the common wools what silk is to cotton."

Charles S. Brown, of New York, writing of his flock of Angora and Cashmere goats, says:

"All these goats can be propagated with great profit. They are easily kept, requiring only the coarsest food, and will thrive better upon low bushes than green pasture. I have found them robust and healthy, and have never known any sickness among them."

Hon. George A. Porter, of Baltimore, Maryland, writing of his flock of Angora goats, says:

"I herewith send you two numbers of the *American Farmer*, April, 1860, and July, 1861, which will give you some interesting particulars respecting these goats, also some idea of their value. I think you will be convinced that the half-breeds will prove quite valuable. I have lived many years at Constantinople, occupying the post of United States consul, and procured and shipped for Dr. Davis the first of these goats that were ever brought to this country. You will see that Dr. Davis and Mr. Peters have made a profitable business crossing back to the full Angora."

The "American Farmer" says:

"The Hon. W. H. Stiles has imported eight of the goats from Smyrna. They are no less curious than valuable, something of the shape and size of our common breed. They differ widely in their hair, which grows so luxuriantly as to give them the appearance of sheep with an immense fleece on. The experiment having been thoroughly tried as to their thriving in our climate, and resulting satisfactorily, there can be no doubt as to the value they will be to our country."

S. S. Williams, Granville, Ohio, writes:

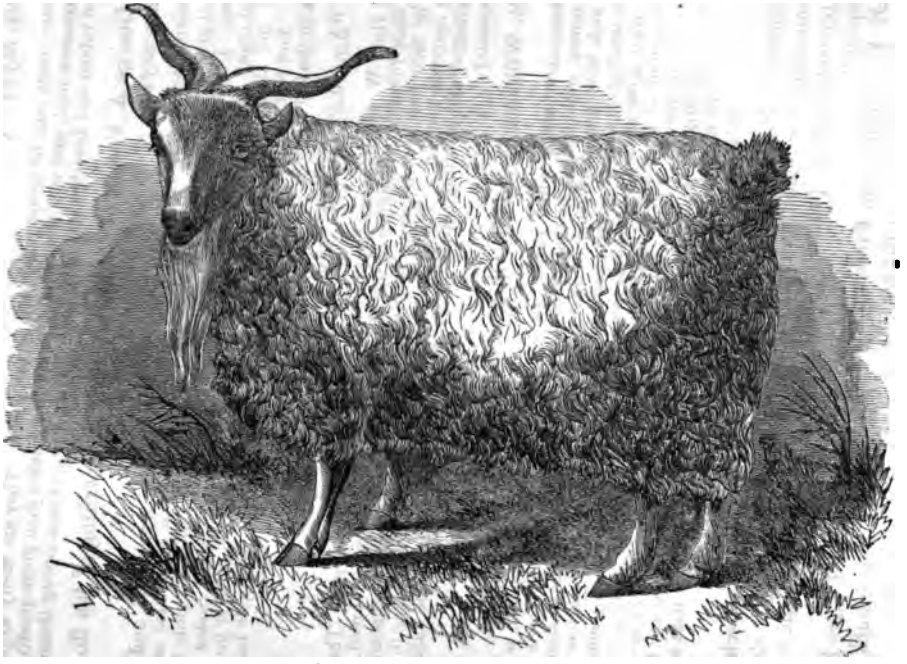
"I have about one hundred goats. In regard to the breed of my goats, whether Angora or Cashmere, mine belong to that breed first introduced by Dr. J. B. Davis as Cashmeres, and which have generally gone by that name to this day. But if the Cashmere goat is the animal bearing a coat of coarse hair, with an undergrowth of only a few ounces of fine fleece, then mine are *not Cashmeres*, though known as Cashmeres in this country; and from the description of Rees and others, mine are the *Angora*, for they describe my goats as correctly as I can myself. I rest satisfied that our goat, whatever it should be called, is valuable, and I care little for the name. I send you a sample of the wool of my buck Sampson, which clips over six pounds. Of course I think he is more valuable than an animal yielding only three ounces of but little finer quality."

General J. S. Goe, Brownsville, Pennsylvania, has a fine flock of twenty in a good condition, beautiful and thriving. He says, "they have stood the severe winter well, and are promising, and I am encouraged with the experiment and prospect."

Dr. F. F. Robinson, Freedom, Pennsylvania, says: "I have been quite successful in breeding from the common goat to my Cashmere buck; find them to be hardy and prolific."

Winthrop W. Chenery, "Highland Farm," Belmont, Massachusetts, one of the most enterprising importers and stock-raisers of the country, has made several successful importations, and has a very choice flock of some twenty pure imported Angoras upon his celebrated stock farm, near Boston, in a good and prosperous condition, where they wintered admirably, standing the rigors of the past severe winter, and are doing well. Mr. Chenery feels much encouraged with his success in importing, and is quite confident of ultimate profit and value:

"The goats will prove profitable in this country, and I would say that, with proper attention, they may be bred and raised as safely and surely as ordinary sheep. One gentleman in



ANGORA GOAT.

nnsylvania, to whom I sold a small flock, writes me that his goats are about a
r than they were, and that he has no more fear of raising them than pigs.'

Deal, of Bucyrus, Ohio, has a fine flock, containing several beautiful
ble imported animals direct from Asia. This flock, from its fineness
ty, has attracted much attention and admiration. Mr. Deal proposes
and breed them to a considerable extent, so sanguine are he and his
their value and success.

W. Ogden, of Montgomery, Ohio, possesses a fine flock, and has been
essful in breeding and crossing these goats with the common goats,
eported his success through the "Ohio Farmer."

. Baldwin, of Philadelphia, Pennsylvania, has a fine flock, mostly
on his own farm, near the city.

Kendrick, of Chicago, Illinois, has experimented considerably and
sfully in raising these goats upon the lake shore and the prairies
s, amply proving that they will succeed in those localities without de-
n. These brief statements of the results of past experiments evidence
ng progress in the development of this important interest, and cer-
y strong expectations of ultimate success.

n a few extracts from some of the various and valuable published re-
le upon this subject, showing the interest it has attracted from time to
he following report on Cashmere goats was made at the exhibition of
d States Agricultural Society, held at Philadelphia, Pennsylvania, in
which a special premium of $100 was awarded to R. Peters, of

ave become known as Cashmere goats from the pure white color, and fineness of
, and their undoubted eastern origin. The fleeces from the matured bucks weigh
seven pounds, those from the ewes from three to four pounds. The flesh of the
uperior to most mutton, tender and delicious, making them a desirable acquisition
-producing animals.

se with which they are kept, living as they do on weeds, briers, browse, and other
age, fits them for many portions of our country where sheep cannot be sustained
ge, while their ability and disposition to defend themselves against dogs evidence
uliar to this race. They are free from all diseases to which sheep are liable, hardy
, and experience has proven that they readily adapt themselves to all portions of
States. The bucks breed readily with the common goats, the second cross yield-
of practical utility, whilst the fourth is but little inferior to that of the pure breed.
t of valuable wool-bearing goats can be raised in a few years by using grade

an extract from a report of the special committee appointed by the
n Institute," at their exhibition in New York city, in 1855:

e examined with much interest the fleece submitted to them, and as well from
servations as from the results of a microscopic examination made and certified to
gentlemen of scientific eminence well known to them, are convinced that the fibre
eece is identical in character, and fully equal in value, to that from which the
ed Cashmere shawls are made. The fleeces on exhibition, and now under exami-
unt to from four to eight pounds each.

rise exhibited by the introduction of these animals into this country, and their
annot be too highly regarded.

hese animals are long-lived, such being the case with the whole goat race.

They are prolific, breeding at the age of one year, with a period of gestation of
nths, and yielding twins almost universally after the first birth.

y are hardy, experience having shown that they will thrive well in our cli-
Georgia to New England, and that they require coarse and cheap food—as the
briers, bushes, &c.—such as is refused by other grazing animals.

y produce a fleece of from four to eight pounds, valued at from $6 to $8 per
France, or Paisley, Scotland, for the manufacture of those high-priced shawls.
can be produced, when the animals become numerous, at a less cost than the
wool, and far superior to it.

of great practical value to our agricultural interests is the facility with which
to breed with the common goats of our country.

"From these and other considerations, of the correctness of which your committee have entire confidence, it will be obvious that every encouragement should be shown this new enterprise—a bold and judicious movement.

"B. P. JOHNSON.
"CHARLES J. GOODRICH.
"JAMES J. MAPES."

The following is the report of the committee at the New York State fair, held in New York city, in 1854:

"The undersigned cannot avoid the conclusion, that in the goats imported, and whose descendants have been the subjects of this examination, we have the first known specimens of that valuable race of animals from whose hairy fleece the celebrated shawls are manufactured known in commerce by the inappropriate name of 'red camel's hair.' As the fleece does not appear to have deteriorated in the comparatively warm climate of South Carolina, the distinctive character of the race is hard to be obliterated, while in the northern region of the United States this character cannot well fail to be permanent. Viewed in this light, the introduction of this animal promises to be of more value to the agriculture of the United States than that of almost any other domestic animal.

"JAMES RENWICK.
"JOSEPH R. CHILTON.
"W. H. ELLET."

Numerous other valuable reports have been given by other State agricultural societies and scientific and practical men, all to the same effect, establishing, by a variety of testimony, the value of the animal and its fleece, its adaptation to our country and climate, and the facility with which it can be crossed and bred with the common goat, by which a flock can be readily raised and increased. Almost all the progeny exhibit the strongest tendencies to the higher and nobler grades by assimilating themselves to the male, and putting on the white livery of the more respectable, honored, and valued race.

The half-breeds much resemble the true Cashmere by yielding as valuable an under-down, or fur, as the shawl goat, and even more in quantity. The grades regularly increase the length and quantity of their wool or fleece as they ascend, and being more prolific than the pure breeds, producing a hardier and even more valuable animal, requiring less attention and feed.

Their local attachment is quite prominent and strong when once accustomed to a place. They may range over the hills or fields and pastures for several miles, but return readily and promptly at night or when satiated. They may be and are herded in large flocks, and readily obey a well-known voice or call, attaching themselves readily to their keepers.

WHAT IMPROVEMENTS CAN BE MADE IN THE BREED OF GOATS.

Here, as in all the departments of stock-breeding, no doubt great improvements can be made, since they possess all the characteristics of other domestic animals. A variety of goats exists throughout our own country, collected from various countries of Europe and portions of Asia and Africa, from which improved individuals may be selected and bred from. Varieties exist in Turkey, Persia, India, Tartary, and Thibet, still remaining to be imported and bred in this country, the introduction of which it might be well for our government to encourage as an animal producing a fleece that would ultimately be worth millions of dollars to our country, and giving employment and profit to thousands of our people. They can be readily, easily, and cheaply imported, the experiments showing that at proper seasons, with ordinary care, flocks of from forty to sixty have been shipped on the decks of sailing vessels from Asia to Boston without the loss of one, and in most cases with but few losses.

If France and other countries have deemed this subject of such pri i portance as to expend thousands of dollars to obtain these valuable ani s, might not we imitate their example and enterprise and possess ourselves of

COUNTESS AND TULIP, 3d.

true "golden fleece?" For all experiments so far have clearly proven that our country, climate, &c., are more admirably adapted than any other outside of Asia.

Machinery is now being erected and perfected by the Lowell, Pacific, and other mills to work up the fleece and manufacture the finest fabrics, thus only awaiting the wools adapted and establishing a market.

Nor does this enterprise conflict with any other of our country, silk raising, sheep husbandry, cotton, &c., each having its appropriate fabric, fleece, use, and sphere, and its limits of usefulness, which commend it to our government, to the well-wishers of our country and her prosperity.

SHEEP.

ECTION, TREATMENT, AND DISEASES OF SHEEP IN THE UNITED STATES.

BY HENRY S. RANDALL, LL. D., CORTLAND VILLAGE, NEW YORK.

SELECTING SHEEP FOR A FARM.

WHERE access to large and good city markets is rapid and cheap, and especially on high-priced and high-tilled farms, where sheep are kept but in limited numbers, as part of a system of convertible husbandry, improved mutton sheep are the most profitable. In interior situations, remote from such markets, the Merino or fine-woolled sheep yield the best returns.

SOILS AND CLIMATE.

Mutton sheep, to develop their characteristic qualities successfully, require soils ranging from medium to first class, and consequently those yielding regular and good feed. Some mutton breeds, like the South Downs, thrive best on dry uplands, producing abundant and nutritious but not rank vegetation. rs, like the Lincolns and Leicesters, prefer moist, rich, alluvial valleys, the grasses are abundant rather than delicate. With the Merinos dry- of soil is indispensable. There may be swamps or other wet lands on r range to which they have free access, but they cannot be confined to without injury to their health. They will thrive on scantier feed than other of the improved mutton breeds, and may be made to travel further in it. During the great scarcity of grass in Texas, in the remarkably nter of 1860, Mr. Kendall's large Merino flocks daily travelled four ive miles from their folds to fill themselves with the dried and frozen her- s; yet he lost scarcely one per cent. of their number, and they reached the in fair condition.

ne mutton sheep are sufficiently hardy in temperate climates where they d winter protection. The Merinos are capable of enduring greater x temperature with comparative impunity.

THE MUTTON BREEDS.

The improved mutton breeds which have found most favor in the United States are of the long wool—the Leicesters, Cotswolds, and New Oxfordshires; of the short and middle wools, the South Downs, the Hampshire Downs, the Shropshire Downs, and the Oxfordshire Downs.

THE LEICESTERS.

The Leicester sheep, under the most favorable circumstances for their development, perhaps excel others in earliness of maturity, and none make better returns for the amount of food consumed by them. But they require better shelter, keep, and care than any other variety. The ewes are not so prolific nor so good nurses as those of the other mutton families; and their lambs, when first dropped, demand a good deal of attention. The mutton is only medium in quality, and, owing to its great amount of outside fat, is not generally sought to supply American tables. In England, however, these sheep particularly meet the wants of a large class of producers and consumers, and have been more extensively grown there than any of the large mutton varieties. But judging from the sheep shown in the metropolitan—London—markets in 1858 and 1862, the comparative production is diminishing. In the former year 25 per cent. of all the sheep shown were Leicesters, in the latter year but 22 per cent. The wethers are marketed in England at from twelve to fifteen months old, and weigh—says Professor Wilson—from 120 to 150 pounds each. The fleeces are composed of a long combing wool, and average from 6 to 7 pounds each. In small, selected, breeding flocks in the United States, yearlings and wethers have yielded from 10 to 15 pounds of wool, and breeding ewes 8 pounds.

THE COTSWOLDS.

The Cotswolds are a larger, hardier, and more prolific sheep than the preceding, and the ewes are better mothers. They furnish a valuable combing wool, and the average of fleeces in England is from 7 to 8 pounds. Selected flocks produce considerably more wool. Mr. Spooner says that the wethers, fattened at fourteen months old, in England, weigh from 15 to 24 pounds per quarter, and at two years old from 20 to 30 pounds per quarter. They frequently are made to weigh considerably more in this country. Their mutton is superior to that of the Leicesters, the fat being less abundant and better mixed with lean meat. They are much used in crossing other breeds and varieties. They impart more hardiness, with stronger constitutions and better qualities as breeders, to the Leicesters, and thicken them in the hind quarters. They give size, longer wool, and more wool to some of the short-woolled families. They are decidedly favorite sheep with the breeders of long wools in the United States.

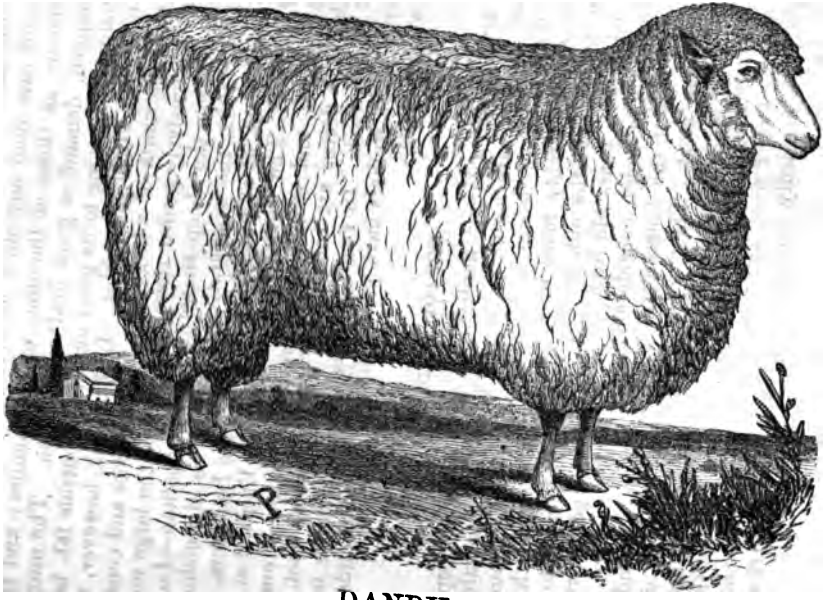
THE NEW OXFORDSHIRES.

This is a comparatively new variety produced by a cross between the Leicesters and Cotswolds—the Cotswold blood considerably predominating. In hardiness and in most other particulars they take a middle place between the original stocks; but the few which have been introduced into the United States are pronounced excellent breeders and nurses. Yearling ewes weigh, in ordinary condition, from 125 to 175 pounds; fat wethers at three years old from 175 to 250 pounds.

THE SOUTH DOWNS.

The South Downs are the oldest established short-woolled improved mutton variety. They are too well known to require particular description. The

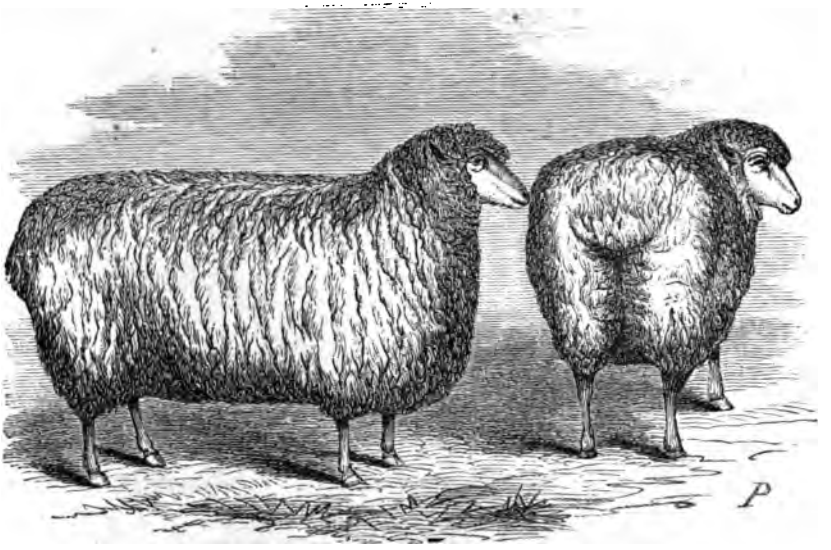
PLATE X



DANDY.

Cotswold Ram, imported and owned by H. L. Chaffee, of Jefferson, Ohio. Bred by John Line, Cirencester, England.

PLATE XL.



JANE AND KATE.

Cotswold Ewes, imported and owned by H. L. Chaffee, of Jefferson, Wm. & John Lane, Cirencester, England.

VAN INGEN & SNYDER

of them and of their congeners, the Hampshire Downs, shown in the
markets in 1858, was 10 per cent. of the whole number of sheep
n; in 1862 they had risen to 15 per cent. of the whole number. In prime
rican flocks, wethers twenty or twenty-one months old at Christmas, dress
75 to 100 pounds weight. At two years old they weigh from 100 to 120
ds each. Their fleeces average from 4 to 6 pounds, according to the keep-
and breeding of the flock. They are not as hardy as the unimproved
Downs, or as the cross between the South Downs and some other short-
led varieties, but they still rank among hardy sheep; and they are good
ers, being capable of travelling much further for their feed than any of
long wools. Their mutton sells in England for 3½ cents more per pound
Cotswold and Leicester, and half a cent more than the other improved
t-woolled families and their varieties. They are prolific and are excellent
es.

THE HAMPSHIRE DOWNS.

his family is the result of a cross between the South Downs and a short-
led English variety of greater size and better constitution. Some writers
ecture that they have also a slight infusion of Cotswold blood. They are
ier in appearance than the South Downs, and their mutton sells half a cent
per pound in the market; but they possess nearly all the good qualities
e former and are hardier. They are favorites in many parts of England,
have not been introduced extensively into the United States.

THE SHROPSHIRE DOWNS, OR SHROPSHIRES.

hese, like the preceding, have been produced by a South Down cross in a
hardy short-woolled stock; and most of the flocks have also a dip of the
ester and Cotswold blood. They are nearly as large as the last-named
lies; and they promise to unite to an uncommon degree the good quali-
of the short and long wools, being larger than the former and hardier and
easily kept than the latter; while their mutton is of good quality, and
ewes are highly prolific and are excellent mothers. Superior specimens of
are to be found in the United States and Canada.

THE OXFORDSHIRE DOWNS.

his comparatively modern family is of a cross between the Hampshire
ns or the South Downs and the Cotswolds, and the statements above
e in respect to the Shropshires will apply equally well to them, though
two families vary in appearance and in several of their minor qualities.
Oxfordshire Downs have been tested on rough, rocky, briery pastures in
achusetts, and have given great satisfaction, as hardy, easily kept mutton
p.

MERINO SHEEP.

original importation of Merino sheep into the United States from Spain
ded all the most prominent cabanas of that country. But, as a general
, the different families, even when preserved pure from foreign admix-
, were crossed promiscuously with each other. The Saxon, French, and
Merinos were of later importation.

ne original Spanish stock, but two are now represented by distinct fami-
mely, the Infantado and the Paular.

THE IMPROVED INFANTADOS.

hese sheep, originally imported by Colonel David Humphreys, of Connec-
, have been preserved pure to the present day. They are a fourth, if not
heavier than their Spanish ancestors, and are the largest family of

American Merinos. Full-grown ewes, in their prime, weigh about 100 po and some of them 120 and 130 pounds. They are much rounder in th broader, fuller in the quarters, shorter proportionably in the limbs, and str in the bone than were the Spanish sheep. They are indeed models of pactness and of beauty when judged by fine-wool standards. Their hard in respect to locomotion, or, in other words, their ability to travel, is not ably as great as it was sixty years ago; for, having no necessity to dri sheep eight hundred miles a year, as did the Spaniards, the American br in the place of that useless ability to travel, has developed those qu which increase aptitude to take on flesh and produce wool. The imp American Infantados appear to be quite as hardy in other particulars as ancestors—are more prolific, better nurses, and when properly fed, resist vicissitudes equally well, and endure cold even better; but they probab mand better keeping. They will thrive, however, where none of the n breeds above described would find sufficient subsistence. Choice Infa flocks with the usual number of sheep of different ages, yield from 9 pounds of wool per head. The fleece is longer, thicker, and covers the ent parts of the animal far better than it did on the Spanish sheep. The ity is probably as good.

THE IMPROVED PAULARS.

The improved American Paulars bear the same relation, in several lars, to the preceding, that the Devons do to the Short Horns among They are smaller, consume less feed, and perhaps can better endure depriv of it. Accordingly they are the sheep for cold, meagre soils; for the scant bage of mountain districts, and for plains subject to periodical droughts. have about the same general improved points of form as the Infantado are shorter bodied. As breeders and nurses they are equal. Their flee of equal quality, but are a pound or two lighter to the head. For that r and on account of the greater size of the former, there is, at the present a prevailing inclination to cross the Paular flocks with Infantado rams. produces an admirable result for the wants of many farmers; but it wo very unfortunate if the present mania for great fleeces should lead to th in its essential family purity, of a class of sheep so well adapted to ext regions of our country.

THE SAXONS.

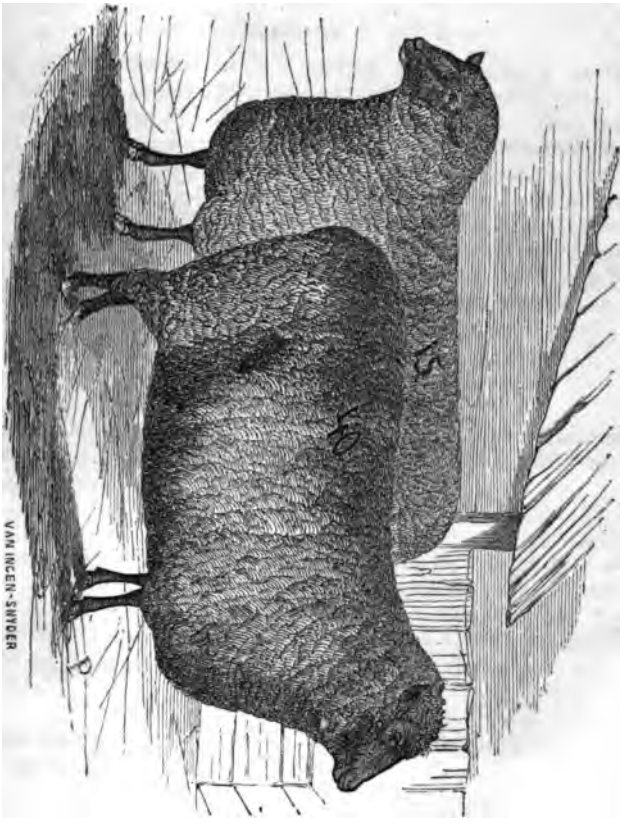
The Saxon sheep formerly had a multitude of zealous and skilful b in the United States. But they have so generally disappeared, and are l so little estimation, that they do not require any description here.

THE FRENCH MERINOS.

The Merinos imported into the United States from France were genera largest that could be procured in that country, and they were from 2 per cent. larger than the present American Merinos. The best of the well formed for animals grown so far beyond the natural dimensions o breed, and they had a fair degree of compactness. They were also pr wooled, but none carried as much wool for their weight as the choice An Merinos. Their wool was of good medium quality and quite even on t cass. A much larger number of them than the preceding were gaun ribbed, unthrifty animals, great consumers and hard keepers. Their were very uneven. Everything goes to show that these were mongrel grades between Merinos and some large, coarse-woolled variety. Th French Merinos, placed under a system of keeping resembling that of l or treated as the careful growers of the improved mutton breeds tr sheep, would undoubtedly be profitable in the United States; but such

"No. 23."

South Down Ram, bred and owned by Samuel Thorne, of Thorndale, N. Y.



"No. 15 and No. 40."

tem does not accord with the habits or traditions of American wool-growers, and the French Merinos, treated like our American Merino sheep, are wholly incapable of sustaining themselves. They lack ability to withstand either exposure to the weather or short keep. Accordingly, though but little more than twenty years have passed since their introduction among us, the full bloods are now nearly as much out of favor in the northern and eastern States as the condemned Saxons. A quarter of their blood, however, mixed with the American Merinos makes a large sheep, which is a favorite with many farmers. The cross between the French ewe and American ram, after being continued for several generations, ought, with properly selected animals, to produce a striking result; and probably that result will yet be witnessed.

SILESIANS.

The sheep called Silesians in this country were produced in Silesia by breeding one hundred Spanish Infantado ewes to four Negretti rams, and their descendants together from 1811 down to the present day. They are evenly and beautifully woolled, and carry a good weight of it considering its superior quality. They are larger than any American family of Merinos, and they are also longer in the legs and longer and thinner in the neck, in proportion to size. They are, throughout, a less compact animal. Their hardiness has not, so far as the writer is informed, been tested under the ordinary systems of management in our country. Their merits as competitors with the American Merinos will be much better understood when such a test is made.

PRING MANAGEMENT OF SHEEP.

TURNING OUT TO GRASS.

Sheep confined to dry feed in the winter should be put upon grass in the spring gradually—*i. e.*, but for an hour or two a day at first—to prevent scouring or diarrhœa.

TAGGING.

To save wool and add to the health and comfort of sheep, they should be tagged before they are turned out to grass in the spring. This is performed by cutting away the wool around the vent and from the inside of the thighs. Sheep, and especially ewes which have not lambed, should be handled carefully, and laid on their sides while the operation is performed.

BURS.

All dry burs which attach to wool should be exterminated from the pastures before sheep are turned on them in the spring.

LAMBING.

Lambs should be allowed to come as early as the weather will permit with reasonable safety, for it is better to lose two in the spring than one the next winter. Ewes should have sheltered places to lamb in, which can be closed up and made warm in cold nights. Mechanical assistance ought not to be given in case of difficult parturition until a considerable period has elapsed, and until the ewe begins to exhibit signs of failing strength. It should then be rendered with great caution and gentleness; and if the ewe continues her throes, the lamb should be pulled only during the throes. If the ewe becomes very weak before or after lambing, a gill of sound ale will be a benefit to her. If the womb is inverted, cleanse it, if dirty, with tepid water, then wash it with a solution of alum or a decoction of oak bark, and gently return it. If again protruded, return it in the same way and take a single stitch with twine through

the lips of the vagina, tying it loosely enough to permit the passage of urine. If this does not suffice, tie a waxed cord round the womb close to the breech, and let it slough off.

MANAGEMENT OF NEW-BORN LAMBS.

If a lamb can help itself, never interfere with it. If it is weak, hold it on its feet and let it suck. Rubbing it on the rump, loins, &c., with a finger is mistaken by it for the licking of its dam, and greatly encourages its efforts. For those cases where the dam has no immediate supply of milk the sucking bottle should be in readiness, with an artificial India-rubber nipple on it; this article is now made and sold expressly for the purpose. The milk of a new milch cow is alone suitable, and it should be given at its natural temperature. If the lamb is found soon after it is dropped, let it suck as much as it will, and four or five times again during the day and evening. If the lamb has been dropped some hours and is very hungry, it is not safe to allow it to fill itself at first.

CHILLED LAMBS.

If a lamb is found chilled by the cold—unable to move or to swallow, it should at once be put in a bath of water about as hot as can be comfortably borne by the hand, or placed in a warm oven, or in the absence of the preceeding, held over a pan of coals and turned and kneaded by the hands until it revives sufficiently to swallow. Then give it a feed of milk containing from half to a teaspoonful of gin or other spirits, according to the size of the lamb and the apparent necessity. If a lamb is becoming chilled, but is still able to swallow, the above stated dose will promptly restore it.

CONSTIPATION, DIARRHŒA, ETC.

An injection of warm milk, with a sufficient infusion of molasses to give it a chocolate color, is by far the safest and most effectual remedy for constipation in young lambs. Hold the lamb up by the hind feet, so that its fore ones just touch the floor, and then with a small syringe administer half a gill or a little more of the above-mentioned fluid. If dung is not soon discharged, repeat the operation. The diarrhœa of a sucking lamb rarely requires attention, but if it does, a spoonful of prepared chalk in a little warm milk should be given at intervals of a few hours until it is checked. The first yellow excrement sometimes adheres about the vent so as to prevent subsequent discharges or render them very difficult. It should be removed and the parts rubbed with dry clay, chalk, or in the absence of anything better, dirt. If the lamb has difficulty in making water, a little pumpkin-seed tea removes the difficulty.

CUTTING TEETH.

If the lamb appears to suck with difficulty or reluctance, its mouth should be examined, to see whether the front teeth are through the gums. If not, and the gums are inflamed and tender, they should be opened over the teeth with a sharp knife.

SWELLED NECK.

When lambs are born with the glands of the neck enlarged, a strip of woollen cloth should be bound round the neck and wet a few times a day with a strong solution of camphor. If this is not found effective, wet the cloth with tincture of iodine.

RHEUMATISM.

Lambs sometimes are born with stiff necks, or their necks become stiff subsequently. Some, particularly about the period of being turned out to grass,

MOUNTAINEER.

Paular Ram, bred and owned by John S. and Virtulan Rich, of Richville, Vt. Eleven months old.

ame in their legs, hobble about, and, in some cases, are unable to
ut them in a warm, dry place, and give two or three spoonfuls of
one of turpentine, once or twice, as may be required, to each lamb;
he affected parts with hartshorn or opodeldoc will assist in the cure.

TREATMENT OF EWES AFTER LAMBING.

should not be required to move about much for a few hours after
If her teats are closed against the efforts of the lamb, squeeze them
the wetted fingers. If they have been cut off in shearing and are
), reopen them with a needle, followed by a hot knitting needle, insert-
er further than is necessary. The sucking of the lamb will generally
n open; but if they become inflamed, the ewe must be held for the
uck, and some cooling lotion applied to the part.

GARGET.

udder is hard and hot, it should be fomented by frequently and con-
applying to it a cloth dipped in hot water. Repeated washings with
er produce the same effect, but more slowly, and with a greater ten-
dry up the milk. If the lamb is dead, and there are indurated tumors
der, apply iodine ointment.

DISOWNING LAMBS, ETC.

which disowns her lamb, or one which is required to adopt a foster
uld be confined alone with it in a dark place, and, if possible, out of
f other sheep, and she should be held several times a day for it to
rightening a ewe when with her lamb, by showing her a strange dog,
ld wearing a bright colored mantle, sometimes arouses her dormant
instincts. If a ewe's dead lamb is skinned, and the skin tied on a
mb, she will generally readily adopt it. If she hesitates, rubbing gin
ose and sprinkling it on the lamb will facilitate the process.

DOCKING AND CASTRATION.

processes should be performed when the lamb is not more than two
weeks old, and before warm weather comes on; and it is an excellent
mear the wounds with a compound of tar, butter, and turpentine. The
ld be cut off so that no part of the bone is left uncovered. Castration
ration sufficiently familiar to most farmers.

SUMMER MANAGEMENT

TIME AND MODE OF WASHING.

enerally held by those who have tried it that early shearing is prefer-
sheep, if they can be subsequently housed in case of severe storms or
y cold nights. As early washing is improper in cold climates, it is
at sheep should be shorn unwashed. This is a question on which the
wer should be allowed to exercise his own judgment; nor should any
npt to compel washing, or to take advantage of its omission by in-
a particular and fixed rate of shrinkage on unwashed wools. The
e on every lot should be proportioned to its actual condition, as de-
de on wheat, other products, or foreign wools which contain
The mode of washing sheep does not require to be here described.

CUTTING HOOFS.

y generally require to have their feet trimmed at least once a
do this at washing, when the feet are clean and soaked soft;
after shearing.

SHEARING.

Shearing should take place when the oily-feeling matter, termed yo so far reappeared in the wool as to give it its natural brilliant appearar silky feeling. The mode of shearing cannot be described here in detail wool should be cut off evenly and smoothly, reasonably close, but not the skin naked and red, which renders the sheep very liable to receive from cold. "Stubble shearing" and "trimming," *i. e.*, leaving the wo so as to give the next fleece the appearance of extraordinary length, or it long in places, in order to affect the apparent shape of the animal, a frauds.

DOING UP WOOL.

The fleece should be as little broken as possible in shearing. It sh gathered up carefully, placed on a smooth table, with the inside ends put into the exact shape in which it came from the sheep, and presse together. If there are dung-balls, they should be removed. Fold in es one-quarter, next the neck and breech one-quarter, and the fleece will t in an oblong square form, some twenty inches wide, and twenty-five o inches long. Then fold it once more lengthwise, and it is ready to b up and tied, or placed in the press. The improved wool-press, worke lever, or by a crank, &c., does the work far more expeditiously, far bet with much less labor than doing it up by hand. Three bands of m sized twine (flax or hemp) once round are enough for the fleece. It is lent to put the unwashed wool of sheep that have died with disease, or which have been killed, or unwashed tags, into washed fleeces. It fraudulent to sell burred wool so done up as to conceal the burs, without notice to the buyer. The burred wool should be put by itself, so that th can open and examine it.

STORING WOOL.

Wool should be stored in a clean, dry room, tight enough to keep ou vermin, and insects. If sacked and sent off to market, it is put up i nine feet long, formed of two breadths of burlaps thirty-five or forty wide.

REGISTRATION.

Flock-masters, anxious to improve their sheep by annual and selection, have them numbered on the side with brands as they are s and in a register set down all the most prominent characteristics of eac The register is made by ruling a blank book into columns, and placi each the names of the characteristics to be recorded, such as "length o "thickness of wool," &c. The record is made by placing figures columns opposite the numbers of each sheep. Figure 1 denotes the ma figure 5 the minimum of each characteristic, and the intermediate figur mediate grades of quality. This enables the flock-master to select the sheep to sell, kill, &c., at any period of the year.

STORMS AFTER SHEARING.

Cold storms sometimes come after the proper time of shearing, an highly injurious, or even directly destructive to the lives of sheep, unl are put into barns or under sheds. A dense forest, especially on the of a hill, is vastly better than no shelter under the circumstances.

TICKS.

A fortnight after sheep are sheared the lambs should be dipp coction of tobacco strong enough to kill ticks and their eggs in the w

VAN INGEN & SNYDER

performed in a box or kettle, with a grated shelf on one side, to conck the fluid as the lamb is laid on it and its wool squeezed, or two be used, dipping the lamb in one, and standing it up and squeezing in the er. In tobacco-growing regions the refuse stems may be pose; elsewhere the farmer should grow a few tobacco plants The dipping of the lambs annually will keep ticks out of a m it, they are highly destructive to condition, health, and even

ATTENTION TO HORNS, ETC.

ary at shearing to cut off the wool clean between the horns, and a of rams. Otherwise the least fracture of the skin on the head to the parts becoming fly-blown, and to the generation of maggots reason horns which press on the head should be sawed off, or from them, which will prevent such pressure. And as rams do dize each other immediately after shearing, and are prone to fight, it practice at shearing to smear them at the base of and behind the tar and turpentine, or fish-oil.

MAGGOTS.

maggots are produced in any wound or sore on sheep they can be by the application of turpentine, and tar should then be smeared over . If the ulcer is old and ill-conditioned, a solution of corrosive sublidissolved in a quart of alcohol) will even more effectually ots and repel flies, and at the same time act as a good stimulant

SALT.

ep should have access to salt, placed under cover, all the time, or they be regularly fed as much as they will eat once a week.

WATER AND SHADE.

is not absolutely indispensable in the summer pastures of sheep, but thrive better with it, especially ewes and their unweaned lambs. The is true of shade.

FALL MANAGEMENT.

WEANING AND FALL-FEEDING LAMBS.

uld be weaned at four months old, and should have a nice, sweet, of feed in readiness for them on being separated from their dams; they should have prime pasturage until the setting in of winter. If it they should be fed some green substitute for it, or receive an allowance . Those breeding mutton sheep often feed cabbage or roots, or fold s on rape. Lambs of any kind should be kept growing from the day th until they reach maturity. This is the great secret of raising bly. As soon as the cold, heavy, autumn rains begin to fall, ld be housed nights, and as winter approaches they should be shelcold storms in the day time.

FALL-FEEDING BREEDING EWES.

we ing their lambs should be put on dry, short pasturage, dri off, and then on feed which will rapidly restore their flesh. en as lambs demand shelter and extra feed before winter, doubt that they amply pay for it in condition, especially ewes beginning to lose their strength. Strong, middle-aged no other extra feed than hay or cornstalks until winter

sets in. "Sheep well summered are half wintered." To let them become before winter, renders it difficult and far more expensive to winter them sa and well; they are not as likely to take the ram, and their product of wo diminished. And if quite thin, there is an absolute peril to their lives if winter is an unfavorable one, however well they may be taken care of. danger is the greatest to the quite young and the old sheep. These someti will not improve, but begin to run at the nose and eyes, gradually lose t appetite, grow weaker and weaker, in some cases exhibiting costiveness, an others obstinate diarrhœa, and perish miserably. When they commence g in this way, medicine, feed, and care are almost thrown away upon them.

COUPLING, ETC.

Before rams are put with the ewes in the fall, the latter should be examine directly and by the register—and divided into parcels, so that each parcel be coupled with the ram most suitable to correct the defects of the dam in offspring. Thus the shortest woolled ewes would be selected out for the lon woolled ram; flat-sided and long-legged ewes for a peculiarly round-bodied short-legged ram, and so on. A ram running with the ewes ought not gene to be trusted to serve more than fifty. If taken out nights and extra fed, a strong animal will serve a hundred. By keeping him separate from the e and allowing him to serve them but once each, he will serve two hundred, some uncommonly vigorous rams have served three hundred, and even mo a coupling season of six weeks. The best feed for the ram, besides good or grass, is a mixture of, say, two parts oats, one part peas, with a slight sp ling of wheat. He should be fed a few days before the coupling season, mencing with not more than half a pint, and increasing gradually to a qua the time his work commences. Some old rams, which have become use hard work and high keep, will consume nearly double that quantity. Merino ram is in his prime from three to seven or eight years of age. The lamb gets good stock if not overworked, but this premature use trenches o subsequent vigor. The periods of heat in the ewe recur from the fourt to the seventeenth day. Her average period of gestation is about one hu and fifty-two days.

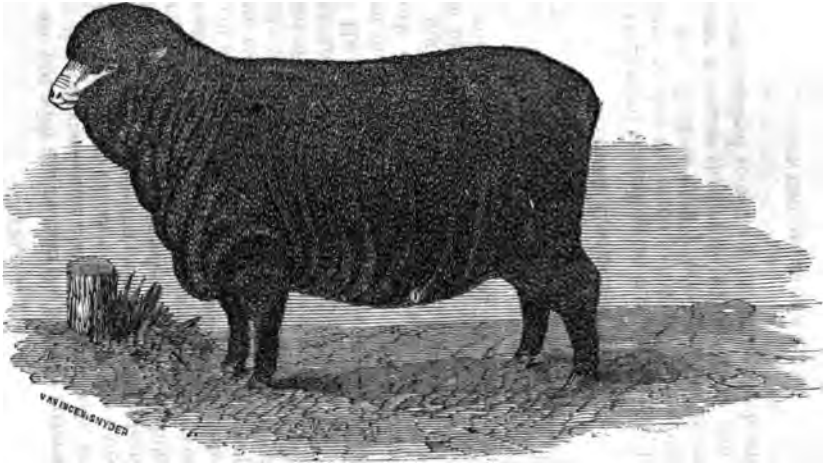
DIVIDING FLOCKS FOR WINTER.

Sheep should be divided according to size and strength before they ar into winter quarters, so that the strong shall not take advantage of the we the rack, trough, &c. This is highly important. The smaller the numb sheep kept together in winter the better it is for them, and good farmers allow more than one hundred to occupy the same stable and yard.

WINTER MANAGEMENT.

WINTER SHELTER.

There is no part of the United States, if there is of the world, where are not better for some degree of winter shelter. In western Texas and Gulf States, perhaps, they demand no more than a pole-shed or dense cl trees to break the fury of the "northers;" north of latitude 40° to 42°, barns or stables, with abundant ventilation, are beginning to be preferr careful and systematic breeders. Open sheds are too much exposed to d snow, and they cannot be shut up and made warm enough for early la A room twenty by forty feet in the clear will properly accommodate se five Paular sheep, and they can all eat at a time, without crowd racks placed around it. The Infantados want a little more room; English breeds still more. Sheep barns should be placed in dry, e but not windy situations. They are usually two stories high, the



INFANTADO EWE.

Bred and owned by W. R. Sanford, of Orwell, Vt. One year old.

used for the storage of hay. The sheep stables underneath should be at seven or eight feet high. A room large enough to hold one hundred and rinos may be partitioned across the middle by feeding racks, and venty-five sheep kept on each side—their outside yards being also divided— more than one hundred and fifty ought to breathe the atmosphere of the ral apartment, however it may be divided on the floor. The rooms be well lighted, capable of abundant ventilation, and that ventilation tly employed. Confined, impure air is highly injurious to sheep, and fatal if a dangerous epizootic makes its appearance in the flock. The box-rack is now generally preferred in sheep barns and yards. The sta- es sh l be kept well littered down, and should be thoroughly cleaned out ıree times during the winter, so that the sheep should not lie, especially thaws, on fermenting beds of manure. It is well, at intermediate periods, er gypsum over the manure before covering it with fresh straw, as this the escaping gases, and adds greatly to the value of the manure. eepyards should, if practicable, be on dry gravelly ground, and should have t three times as much area as the stables. They should have high, tight on the sides most exposed to severe winter winds, and should be kept ıttered down. Habitual exposure to mud and filth is highly injurious to

CONFINING SHEEP TO YARDS.

The close confinement of sheep to stables and small yards operates on them it does on all other domestic animals: it renders them torpid in habit, and tes the taking on of fat and flesh. This is well for fattening sheep, for breeding ewes. The want of exercise and the increase of condition that tendency to plethora which is natural to pregnancy, and though evil effects of this are not always visible in the offspring, yet there come when other co-operating conditions render it highly destructive. The re yeaned small and weak, and those that live are of but little value. ng ewes should have exercise by having access, at proper times, to a , or obtain it in some other way.

WATER AND SALT.

Water is indispensable to sheep fed on dry feed in the winter, and they should ve constant access to it. Salt is also indispensable to vigorous health. It is proper to salt sheep-hay heavily when it is put in the mow or stack, or to ne all their hay for them at intervals, because in either case the instincts of animal are not left to guide its consumption. Salt should be placed in xes in the sheep-house so that they can eat it at will; or the orts taken from rack may be brined and put in a large rack kept for that purpose where the ep can come to it at their pleasure.

AMOUNT OF FOOD CONSUMED AND VALUE OF DIFFERENT KINDS.

It is estimated that all sheep daily consume, in the average winter weather northern States, about one pound of hay, or its equivalent, for every pounds of their own live weight. All that they will eat of meadow hay ut the amount of nutrition demanded by the Merino sheep in good, plump, c ition. If a portion of more concentrated food like grain, is given, its nutrition may be safely counterbalanced by feeding a corresponding of food less nutritious than hay, as, for example, straw. Barley and , if cut and cured green, are highly relished by sheep. Wheat straw o, and they will eat but little besides the chaff and heads of it, if they ntain ot food. Rye straw, unless chopped fine and mixed with meal, lly unfit for sheep feed. Pea-haulm, if cured green, is an admirable y and dead, as it is generally gathered, it is wholly valueless

except for manure. The blades and tops of nicely cured cornstalks make prime sheep feed. Fine red-clover hay, cured bright and green, is better than the best meadow hay, and on a full winter allowance of it sheep actually fatten; it is also highly favorable to the milk secretions in breeding ewes. The grains and pulse most used in our country for sheep feed are oats, corn, and peas. Oats are given to store sheep and lambs; corn is given to fatten sheep, and with some it is a favorite for all other classes of sheep. Some excellent feeders, like Mr. Johnston, of Geneva, New York, employ buckwheat. Peas are fed in a few instances to breeding ewes, and they greatly promote the growth of wool and the secretion of milk, but they are too scarce and expensive for common use. The same is true of beans, though they are accounted among sheep-breeders more heating, and therefore less suitable feed. Bran and shorts, mixed with a little grain, make a most excellent feed both for lambs and old sheep. Bran-slop is admirable for promoting the secretion of milk in yeaning ewes. Breeding ewes thrive better, and are better prepared in their general physical condition to bring forth well-developed, strong lambs, if they habitually receive green food during the winter, and other sheep are healthier for it. Colic or "stretches," often so serious a malady among flocks confined to dry feed, does not attack sheep that get green feed. In regions adapted to their culture, Swedes and some other varieties of the turnip are especially adapted to this object. There is a beet which was brought from Silesia by Mr. William Chamberlain, (not the variety sold in seed stores as the Silesian beet,) which some persons who have tried them prefer to turnips. Either root is vastly cheaper than grain of any description for the feed of sheep. Carrots have been tried and do not give satisfaction, and potatoes are too expensive.

REGULARITY IN FEEDING.

One of the important points of successful sheep-farming consists in strict regularity in the time of feeding, and in proportioning the amount of fodder to the wants of the animal. With good attention to these particulars, sheep will do better on moderate keep than on the best food fed with irregularity.

DISEASES OF SHEEP.

Only those diseases of sheep which are known to have appeared in the United States will here be noticed, with the single exception of small-pox. This malady is so dangerous, and there is such a strong probability of its being introduced into our country, that our people ought to have some preparatory information on the subject.

SORE FACE AND LIPS.

Sheep's faces occasionally become quite sore when they are at pasture in summer. It is attributed to the effects of St. John's wort, and to some other causes. It is cured by the application of sulphur ointment, consisting of sulphur and lard.

Swelled and sore lips more frequently appear about the opening of winter, but the causes are unknown. Sulphur ointment, mixed with a little tar, is a very efficacious remedy.

OPHTHALMIA.

This disease is characterized by redness of the eye and the parts about it, intolerance of light, and a flow of tears. Bathe the eye occasionally in warm water, and with a weak solution of sulphate of zinc, combined with tincture of opium.

GRUB IN THE HEAD.

Among farmers this is the name given to various different diseases. The gad-fly of sheep deposits its eggs in their nostrils in the months of July and

t, and these being immediately hatched by the warmth and moisture, the
e or young grubs crawl up into the cavities of the head, and attach them-
es to the membraneous linings. They remain there until the ensuing spring,
nen they become thick, plump grubs, more than an inch long. They then
nd from the head, drop on the ground, burrow into it, take the form of a
is, and at the proper time again hatch forth gad-flies. Their effect on
sheep is a matter of considerable dispute, some eminent veterinary writers
lering them entirely harmless. Others, and a much greater number, be-
ve that the irritation they occasion produces disease and death. If the sheep
gin to fall off in condition a little before spring, though previously in good
, and their feed kept fully up; if they wander round with movements in-
tive of pain in the head, and discharge mucus, tinged with blood, from the
se, though oppressed with no catarrhal difficulty, it may be suspected that
y are suffering under the effects of grub in the head. Some persons have
wn tobacco smoke up their nostrils from the tail of a pipe, the bowl being
vered with a cloth, with asserted good effect. Others have injected tobacco-
ter with a syringe, but this must be prevented from entering the throat in any
siderable quantity.

LOCKED JAW.

This has sometimes been produced by cording rams. When discovered,
edial measures are generally too late, and it should be prevented, if possi-
, by more careful cording.

RABIES.

The period of incubation between the bite of a rabid animal and the appear-
ce of rabies in sheep, so far as observed by the writer, averages about three
eks, though it is said sometimes to appear after several months have elapsed.
e first symptom of it is a disposition to ride other sheep. The rabid ewe,
ough pregnant, acts towards other sheep precisely like the rutting ram, and
n employs his peculiar note of solicitation, but if ridden herself exhibits
at rage and fiercely fights the one riding her. Rumination and the natural
petite are completely suspended; the animal gnaws wood, wool from its com-
ions, and frequently the most dirty substances. Nothing is masticated
ularly, but is hastily swallowed after being bitten rapidly and just sufficient
enable it to be forced down the throat. Rabid sheep neither shun water nor
hibit much thirst. Eight days is the average duration of the disease in the
es observed by the writer. At first the propensity to ride appears; second,
praved appetite and rubbing of the head and also the feet against fences, &c.
the second or third day the scars of the wound inflicted by the rabid animal
look red and inflamed, the patient exhibits more irritability, attacks its
anions suddenly and without provocation, and fiercely buts, and in some
bites at a stick thrust towards it. On the fourth day it rushes at a man
enters the pen, and frequently dashes against the fence if a hat or hand-
ief is shaken at it; in some instances thus charging if a person utters a
d or only approaches its place of confinement. On the fourth or fifth day
edges of the wound reopen. On the fifth or sixth day there is considerable
ness, and in some of the cases less ferocity. On the seventh and eighth
s the prostration of strength increases rapidly, the respiration becomes
ored and sometimes irregular, the pulse rapid, and the reopened wound again
up. Where the wound is on the eyelid the cornea becomes white and
ue, and the eye blind. Froth falls from the lips of some, and ropy saliva
m those of others, but neither are persistent or conspicuous symptoms of the
lady. Finally the debility becomes extreme, but there is no stupor, or in-
ility to sight or sound. There is no paralysis. None give up their hos-

tility to men or sheep. The fiercer sheep fight each other when cons falling down from weakness; some utter short, angry bleats as they fight sheep or a stick; but as a general rule they remain silent, except to snuffing or snorting sound when bounding forward to make an attack.

There is no remedy for this terrible malady. It is here described so may be promptly identified, and the proper measures taken if it appear flock. It is doubtful whether the saliva of a rabid sheep will communic disease to men or sheep; but no risk should be run by allowing its sa come in contact with the hands where the skin is broken, and if it does s dence requires that the parts be promptly cauterized with lunar caustic thick black eschar, or scab, is formed over them. The same course wou be prudent on sheep whose skin is broken; but there is no probabilit sheep *bite* any animal so as to break the skin, and thus bring the saliva i tact with the absorbing vessels of the system. In a number of cases wit by the writer, in 1863, the rabid sheep were separated from the flock disease appeared, and put in a yard together. They constantly fo already described, but were observed in no instance to *bite each other.*

OBSTRUCTIONS OF THE GULLET.

Sheep sometimes get a piece of turnip or other substance lodged esophagus or gullet. If it cannot be moved by the fingers, set the sheep rump, holding its nose upward, pour some oil into the throat, and then i small, flexible probang, and very gently push the obstructing substan the stomach. The probang, in the absence of a gutta-percha one, should strong, flexible wood, like elm, made smooth and round, and five-sixteen an inch, or a little larger, in diameter. A small bag of flax-seed sho firmly secured to, and cover, the lower end; and on dipping the rod water, to limber it for use, the bag will become soft and slippery, so as tect the esophagus from laceration. If no flax-seed is at hand, carefully the lower end of the probang with tow and dip it in oil.

HOOVE.

If sheep become swollen from being turned on fresh clover, or the lik should be driven gently about for an hour. If swollen to a dangerous and the distress and oppression are rapidly increasing, a trocar, or, in sence, a pocket-knife, must be plunged into the left flank, half way b the haunch and ribs, and well up towards the back-bone, so that the p gas will escape through the orifice. An ounce or two of Epsom salts a erally administered after an attack of hoove. If the gas continues to f the stomach, give a drachm of chloride of lime dissolved in a gill of wat

POISONS.

The narrow-leafed or low laurel, *(kalmia angustifolia,)* and the broad laurel or "calico bush" or "spoonwood," *(kalmia latifolia,)* are eat sheep, particularly when they are unaccustomed to them, or when th hungry from travelling, and find these bushes growing by the roadsid strong decoction, made by boiling the bruised twigs of white ash for an administered in doses of half a gill or a gill, and repeated after an inte necessary, is believed to be an effectual antidote by persons who have t Drenches of milk and castor oil are also said to have been successfully r to. Injecting warm water into the stomach and pumping it out again, a tinuing this until vomiting is produced or the poison thoroughly diluted, a common India-rubber stomach-pump, *i. e.*, a hollow ball with a per tube attached, would be highly useful in all cases of poison, by whatev duced. This should be followed up by active aperient medicine. Other

laurel are suspected of poisoning sheep, but very little accurate infor- ıas yet been obtained regarding them.

DIARRHŒA.

ıon diarrhœa or scours, not attended with constitutional disease, gener- uires no remedies. If protracted, two or three days' confinement to , or an ounce of prepared chalk given in half a pint of tepid milk, will put a stop to it. If the purging is severe, or accompanied by mucus gentle cathartic of an ounce of Epsom salts or oil should be adminis- a sheep, and half as much to a lamb six months old, and this be fol- p by the dose of chalk and milk above recommended once a day for hree days. But "sheep's cordial" is a better remedy than the chalk, r be kept on hand by every farmer. It is composed of the following nts: Prepared chalk, one ounce; powdered catechu, half an ounce; d ginger, two drachms; and powdered opium, half a drachm. Mix th half a pint of peppermint water, and give two or three tablespoonsful and night to a grown sheep, and half as much to a lamb.

DYSENTERY.

liffers from diarrhœa in various observable particulars. It is attended ; the appetite is irregular and generally poor; the evacuations are as ır thinner than in diarrhœa, but they are slimy, sticky, and very offensive . As the disease progresses, they become tinged with blood, and the apidly wastes away. It sometimes dies in a few days, and sometimes ılong for several weeks. This is treated much like severe diarrhœa, ny persons give two cathartics, instead of one, at the beginning. The practitioners also bleed, if the malady is detected in its very first stage; ıbility has ensued, it prostrates the system too much. The "sheep's requires to be given longer, and after a short period tonics are added— ıger and from one to two drachms of gentian daily. This last is an le tonic. In place of the above remedies, some American farmers give ɔnful of laudanum and a tablespoonful of gin or rum, mixed and put in iluted fluid.

COLIC OR STRETCHES.

s occasioned by confinement to dry food. During the paroxysms the retches itself incessantly, and exhibits much pain. A cathartic of one f Epsom salts or castor oil will usually effect a cure. A drachm of nd a teaspoonful of the essence of peppermint, put in warm water with , adds to their efficacy. Half of the above dose for lambs. Green feed, ;iven only once or twice a week, prevents this malady.

CATARRH.

common in winter among unsheltered sheep, or those which are win- ımall, close, unventilated stables. In its simple form it is not dangerous, s exciting causes are continued; but frequent colds, rendered chronic agement, impair the condition of sheep, and eventually lead to low ıever, wasting and death. An epizootic catarrh, like influenza in y changeable winters, among human beings, occasionally rages with ınce over extensive regions, producing wide-spread destruction in our n flo . The best course is to *prevent* the disease by proper manage Ti .y sheep, in good condition, need not, with reasonable precaution, to taking cold, and if any number of them chance to do so, certainly ; causing it need not be repeated. For simple cold it is not common g, though some careful farmers administer a tablespoonful of tar, and

smear a little of it on the nose. Non-exposure, and dry, well-ventilated sta in winter, generally lead to a speedy cure. If the malady becomes chr and assumes an epizootic and malignant form, no remedy has yet been covered which will control it. Perhaps the best practice would be good, ca nursing.

ABORTION.

Abortion is usually produced by a hurt or injury. It has never, in country, assumed that infectious character that it sometimes does among c but it is well to remove the abortive lamb and the "cleanings" from the sh yard, and also to withdraw the ewe and place her in "the hospital." requires care and extra nursing, or she will become very poor and lose a l portion of her fleece.

PARTURIENT FEVER.

This has as yet appeared only among our English sheep. The ewe a days before lambing appears dull and stupid; her appetite fails, she exh giddiness, and a discharge of a dark color takes place from the vagina. loiters behind her companions, staggers in her gait, her head droops, and eyes are partly closed. If she now lambs, and is carefully sheltered and nu she sometimes recovers rapidly; but if no such relief is afforded, typhoid sy toms begin to occur. She wanders away alone, exhibits great uneasiness pain, and strikes her body frequently with her hind feet. The prostra rapidly increases, and the dark colored discharge from the vagina conti and has an extremely offensive odor. A lamb or a pair of lambs are freque expelled at this stage in a high state of putrefaction, and she is now unabl rise and is almost insensible. Death soon closes the scene.

The ewe attacked by this disease should at once be removed from the fl and if a large English ewe, a dose of two ounces of Epsom salts, with tw three ounces of molasses and one drachm of nitre, mixed with a pint of warm seed gruel, should be administered; and if this does not open the bowel eight or ten hours, it should be repeated. The nitre and molasses are g subsequently, night and morning, in a quart bottle of gruel, until the f abates, when the nitre is discontinued. If the ewe lives to the third or fo day, and the stench of the dark discharge from the vagina shows that the fc is dead, a small quantity of dry, pulverized belladonna is applied with the of a finger to the mouth of the womb every hour until it is sufficiently rela to allow the removal of the fœtus. After this is effected, the womb is thorou syringed with warm milk and water, the ewe put in as easy a position as sible, and her posture changed two or three times every day. She is carefully nursed until recovery. This treatment has proved very successfu

THE SCAB, ETC.

The scab, like the itch in human beings, is produced by an insect, an cure it the insect must be killed. Its first appearance is in little swellings greenish blue tint. A pustule is formed, and about the sixteenth day it bre discharging a horde of insects to burrow in the skin elsewhere. The dise sheep rubs itself with violence against every object, using its teeth and fe allay its intolerable itching, and the wool is torn off its shoulders and sides unrelieved, it pines away and soon dies. If the wool is short, the u usual remedy is to immerse the sheep in a strong decoction of tobacco, s scouring the sores with a shoe-brush, dipped in tobacco-water and soap, suffic to break the scabs. Some add a little turpentine occasionally to the decoct some also knead the sores with their hands while in the decoction. The w once had one hundred and fifty sheep suffering from scab thus treated; t were cured by one application. When it has been performed much more

and carelessly in large flocks, and the sheep returned to their previous nurage, a number of applications has been found necessary. By using the se stems of tobacco the process is not a very expensive one, even though wool be at its full length. Although it cannot then be performed as effectually, it will at least suffice to check the disease until after shearing, when a complete cure may be effected. The following are favorite remedies in England:

1. "Dip the sheep in an infusion of arsenic, in the proportion of half a pound of arsenic to twelve gallons of water. The sheep should previously be washed in soap and water. The infusion must not be permitted to enter the mouth or nostrils."

2. "Take common mercurial ointment, and for bad cases rub it down with three times its weight of lard; for ordinary cases, five times its weight of lard. Rub a little of this ointment on the head of the sheep. Part the wool so as to expose the skin in a line from the head to the tail, and then apply a little of the ointment with the finger the whole way. Make a similar furrow and application on each side, four inches from the first, and so on over the whole body. The quantity of ointment, after being compounded with the lard, should not exceed two ounces, and considerably less will generally suffice. A lamb requires one-third as much as a grown sheep. This will generally cure; but if the sheep should continue to rub itself, a lighter application of the same should be made in ten days."

The large English sheep are here referred to. The Merinos would not require much more than half the quantity stated.

There are a few other cutaneous diseases which are sometimes taken for scab because they occasion a degree of itching and rubbing. In none of them are the sores so conspicuous or the rubbing and stripping off of wool anything like as extensive. All of them, so far as ascertained, yield readily to the effects of an immersion in the decoction of tobacco.

SMALL-POX.

The first symptoms, as described by foreign writers, are dulness, loss of appetite and strength, a staggering gait, and slight indication of fever. This lasts about four days, when eruption commences. Small violet-colored spots appear in various places on the skin, and in the centre of each a pustule, which, at the end, springs up. These pustules are most abundant on the inside of the legs and the parts which are naked or covered only by hair. The diseased animal is inclined to separate itself from the flock. Its back arches, its ears droop, and its eyes are partly closed. Sometimes the febrile symptoms are mitigated when the pustules become developed, but in severe cases the whole skin becomes inflamed, the pulse rapid, the mouth hot, the breath offensive, and the head swollen. Rumination is suspended, the strength rapidly fails, the pustules die away without forming much matter, fetid diarrhœa takes place, and death rapidly ensues. The appearance of the disease, however, as well as their order of recurrence are quite various. It is not important to describe them any further here than is necessary to the identification of the malady. It attacks sheep in all conditions and at all periods of the year, but lambs sooner than grown sheep. In flocks which take it in the natural way from to three-quarters frequently perish. No treatment controls it to any conable extent, and that most generally adopted has consisted of little more good nursing, medicines calculated to throw out the eruptions, mild ients during the febrile stage, and tonics in its latter ones. Both vaccination inoculation have been resorted to, however, with nearly as much advanhuman beings experience by these operations in escaping the natural s of small-pox. Inoculation is generally preferred on the continent of ope. But as it occasions trouble and expense, and, under common treatsome loss of life, it is rarely resorted to until the sheep have been exto contagion, and, therefore, while it mitigates, it does not prevent a eat evil.

appearance of this malady on the American continent would be an inble misfortune; and that importer of sheep-pelts, wool, or the like, who

introduces it here by any voluntary risk, or even unintentional carelessness, will deserve and receive the execrations of all posterity. The disease, though not regarded as identical to human small-pox, is very closely analogous to it in every particular, and is equally contagious. Almost everything touched by the animal diseased will, during a period not yet determined, communicate the malady. The shepherds who handle the diseased sheep are required to change their clothes and cleanse their hands before they go among healthy sheep. The fields, the trees, and fences which have been rubbed against, the yards and stables, and even the grass and roads trodden by sheep laboring under this malady are believed to retain and spread the contagion. It is not likely to be introduced among our American flocks by clothing, pelts, wool, or other inanimate substances, without a very extraordinary train of circumstances—unless, indeed, a shepherd who had handled it should bring his infected clothing to this country and in that clothing handle American sheep. Perhaps such a specimen of stupidity or wantonness is beyond the bounds of probability. But it is very clearly the duty of every inhabitant of this continent to abstain from importing live sheep from any country where the sheep small-pox prevails or has prevailed at a recent date. A swift-sailing steamer would bring sheep from Europe during the incubatory state of the malady.

HOOF-ROT

This is a soreness commencing in the cleft of the foot, and which gradually extends into it, and disorganizes all its structure. The application of almost any caustic will, in an early or mild stage of the disease, eradicate the ulcer, so far as it is brought into direct contact with the caustic and kept in contact with it until its curative qualities exercise their full effects. But the great difficulty is, that among one hundred sheep every ulcer cannot be or is not so carefully uncovered by the knife, or kept so free from filth, that its entire surface is cauterized. And if such a surface of the smallest extent is protected from the caustic by a covering of horn or filth, then the seeds of the future malady and contagion are left in a soil where they are sure to be productive. Or let us suppose that every particle of ulcerous surface in the foot is touched by a mild caustic, like blue vitriol, and then immediately plunged into wet grass, or into moist manure, or washed by blood spirting from the wounded parts, would there be any probability of a radical cure under any of these circumstances? Experience answers none. The difficulty of eradicating hoof-rot from a large flock, under the rough surgery and haste of the farm, can the be fully understood. The writer of this has had hoof-rot at four different periods on his farm, and at least five thousand sheep affected by it, all of which were cured, and he has a right therefore to speak with some confidence.

For mild cases of the malady, blue vitriol is decidedly the best remedy; for severe cases, butter of antimony. The writer has twice cured a flock complete by one application of the former. In the first instance, each sheep had its feet thoroughly pared for the purpose of exposing every part of the flesh the least affected by the disease. The sheep was then placed in a tub of saturated solution of blue vitriol and *hot* water three or four inches deep, and held there by the neck by an assistant. A second one was prepared in the same way and placed beside the first one in the water. When the third was ready the first was taken out, and so on. Each stood at least ten minutes in the solution, which was kept constantly *hot* by dipping out and replenishing from the boiling kettle. The sheep were then placed in a dry situation, and they proved to be completely cured. This was at the opening of winter. Many years afterwards a flock of lambs were treated in the same way, except that as five could stand in the tub of hot solution together each remained in it from twenty to twenty-five minutes. This, too, was at the opening of winter, and

gain the cure was perfect. Probably the hot liquor would be more effective than cold even on the uncovered ulcers, and it certainly would penetrate better to the covered ones. These are the only instances which ever came to the knowledge of the writer of a diseased flock of sheep being cured by a single application of any remedy.

When the foot is extensively disorganized and a powerful caustic is required to remove the dead structure, butter or chloride of antimony should be used. As it combines readily with the fluids in the parts, it almost immediately loses its strength, and it therefore possesses the admirable property of acting almost purely superficially; consequently its action can be regulated by the wishes of the operator. This is not the case with the other strong caustics, like nitric, sulphuric, muriatic acids, &c. These burn deeply and sometimes injuriously into the flesh, and the sores they produce probably render the sheep more subject to subsequent contagion. That is to say, the virus of foot-rot, probably like vaccine matter, takes more speedy and certain effect when brought in contact with the bare and punctured flesh. A favorite remedy among farmers is compounded as follows: One pound of blue vitriol, half a pound of verdigris, one pint of linseed oil, one quart of tar—the vitriol and verdigris to be pulverized fine, and if convenient ground through a paint-mill with the oil before the tar is added. The oil and tar, if allowed to dry on the feet, form a coating which aids to prevent the application from being washed away by moisture. Whatever application is made, the sheep should be kept out of water, manure, &c., until the treatment has had time to produce its full effect. This thorough paring of the foot, so as to effect a perfect denudation of the diseased surfaces, and an avoidance of wounding the foot, so that blood will not be discharged to wash off the caustic, are the conditions to be principally sought after by the operator. Toe nippers and strong knives may be required to remove the outer growth of the horny covering of the foot; but as the operator cuts down near the quick, he should use a light, thin, very *sharp* knife, so that he can cut away all the horn necessary without wounding and thereby causing a flow of blood from the fleshy sole. This is more important where blue vitriol is the remedy; butter of antimony will of itself speedily stanch the flow of blood.

MODE OF ADMINISTERING MEDICINES TO SHEEP.

Sheep medicines administered internally should be in a fluid form, for otherwise they fall into the rumen or paunch, where they do not produce much effect. Even fluids should be poured into the throat with care and deliberation, or they are likely to take the same course. It is common, as in the case of the horse, to give sheep medicine through a horn. Some persons fasten their mouths open by means of a bit of three-quarter-inch board, about two and a half inches wide and four inches long, with an inch and a half hole through its centre, and a strap attached to each end. This piece of wood is placed in the mouth so as to hold it fully distended, and is confined there by tying the straps over the back of the head. By holding up the head of the sheep and inserting a horn or tube through the hole in the wood, fluid can be poured down the throat without difficulty. A probang can more conveniently be inserted through the same aperture in case of choking.

DISTRIBUTION AND MOVEMENT OF NEAT CATTLE IN THE UNITED STATES.

BY SILAS L. LOOMIS, A. M., M. D.

WHATEVER constantly aids the progress of civilization, however feeble force, is of vital importance to a community. But whenever anything is found that exerts a controlling power, it ought to be carefully investigated, and thoroughly examined in all its bearings.

The supply of food occupies the larger portion of the energies of the human race, and it must be provided for in all communities to secure their prosperity, happiness, and advancement. If the constitution of a community is such that all its energies are absorbed in the production of food and clothing, all its sources of improvement will remain closed, and the community will be at a stand still. No time is left to cultivate the mind, and from exhaustive physical labor it readily relapses into a state of barbarism. On the other hand when a community is so constituted that all its energies are not required to feed and clothe its subjects, the mind is cultivated, sources of prosperity multiply, and the nation gradually rises to the highest rank in the civilized world.

In the United States, our fertile and extensive agricultural lands, while covered with a comparatively sparse population, have yielded fabulous crops from a virgin soil. Large profits being thus easily obtained, it has not been deemed necessary to husband resources, and the soil has been allowed to become exhausted, thus creating large tracts of so-called worn out lands in a great number of States.

In a similar manner many aids to civilization may be carelessly neglected, and although advancement may not be at the time perceptibly checked, it will soon become apparent. Hence the agriculturist should avail himself of every means of information within his reach, that he may carefully gather up all the various resources of his country, and reduce the time and strength necessary for the production of food and clothing within the smallest limits, thereby giving greater scope to the development and enjoyment of his and his country's intellectual and moral forces.

In this view the importance which is attached to the agricultural interests of a country is more clearly comprehended. The greater the improvements made in implements of agriculture, the more completely the crops are adapted to the soil and climate, the more the facilities of communication are increased, and the more accurately the agricultural statistics of a nation are obtained, the more will the nation advance with all its other interests.

To aid in this general development, by discussing some of the statistics gathered by the Census bureau in the years 1840, 1850, and 1860, is the object of the present article. It is not claimed that these statistics are absolutely correct, but the error is so small comparatively that the general deductions may be true, and the laws which are developed may be relied upon. These laws will be found to be of vital importance, and the more so as it is the first time they have been placed within our reach.

For the first time we have learned that in the United States every one hundred people require eighty neat cattle; that eight of these cattle must be working oxen, and that this requirement has not varied a single per cent. in thirty years; that twenty-eight of the eighty must be milch cows, and that this number has not varied one per cent. for the past thirty years. For the first time we are enabled to know where a demand for neat cattle exists, and whence

ıay be obtained. Hitherto the supply has met the demand without
ıite knowledge of what value was demanded or from what source it
best supplied. The deficiencies or excesses existing in each State
y very generally or vaguely known, and we rested satisfied while we
have availed ourselves of every means to prevent the diminution of
y already become largely deficient. For example, Massachusetts had
one-half the requisite number of neat cattle within her limits in the
0. In the year 1850 she had less than one-third, and in 1860 but
ɔ-fourth the number of cattle required for the support of her popula-
ıe must therefore import beef, butter, and cheese, having a very scanty
ɔ of milk.

ıere will she obtain these articles? New York, Pennsylvania, New
)elaware, Maryland, and Virginia, have not enough to supply their
ts. Massachusetts must, therefore, actually transport to supply her
es from an immense distance. She must reach into our western re-
d outbid in price all intervening demand. An interesting question
:s, and one of significance to her farmers: Cannot her worn-out waste
made to produce beef, butter, cheese, and milk, at a less cost than to
so far? Cannot the money expended in transportation and profits
ıdvantageously disbursed within her own borders?

ıttle exist in the United States only as domesticated animals. They
principally to supply the demand for beef, butter, cheese, and milk.
icles being consumed wholly by the people, and the personal demand
ɔnstant quantity, the ratio between the people and cattle must be con-
.tever the number of people may be. That is, the personal demand
:ct ratio of the population to the cattle, and that ratio must be nearly
whether the population be ten millions or thirty millions. In the
:ates this ratio is 80 per cent., that is, every one hundred people re-
:attle.

ver people aggregate faster than cattle, whether in cities, manufactur-
:ts, or from other causes, or whenever the population of a district in-
ster than cattle are produced, a deficiency must occur. Into such dis-
le must be imported, and the prices of beef, butter, cheese, and milk,
ıd upon the distance it is necessary to transport them, and the number
added to the original cost.

; has been found to supply the place of these articles, and it is safe to
ıothing will be found as a substitute. We therefore regard the neces-
:ese articles as permanent, and consequently neat cattle must vary as
ıtion varies. Beef, butter, and cheese may be transported, but milk
consumed in the vicinity of its production. This requires that at
ıalf the number of cows necessary for a community be kept in its
ı vicinity, as forty-eight per cent. of the entire quantity of milk pro-
ısed at once as an article of food. Working oxen and stock cattle
necessarily confined to a people. The character of the soil and the
ınt of the inhabitants more particularly determine their locality.

:red as a whole, without eliminating minor disturbing causes, we find
roduction, distribution, and consumption of neat cattle in this country
:ain definite well-marked laws, which must be to the agriculturist of
e value. From them we can foresee what, under the ordinary con-
.hings, the future will require, and make provision for its necessities.
ɔroceeding further with this discussion, it is necessary to introduce
ing tabulated statistics computed from data furnished by the Census
the years 1840, 1850, and 1860:

number of neat cattle returned in 1840 was.....	14, 971, 586
number of neat cattle returned in 1850 was.....	18, 378, 857
number of neat cattle returned in 1860 was.....	25, 640, 337

TABLE I.

Statement of the number of neat cattle according to the census returns of 1840, 1850, *and* 1860.

States and Territories.	1840.	1850.	1860.
Alabama	668,018	728,015	779,183
Arkansas	188,786	292,710	548,173
California	.....	262,659	1,174,434
Connecticut	238,650	212,675	241,907
Delaware	53,883	53,211	57,721
Florida	118,081	261,085	35[illegible]
Georgia	884,414	1,097,528	1,00[illegible]
Illinois	626,274	912,036	1,[illegible]1
Indiana	619,980	714,666	1,17[illegible]
Iowa	38,049	136,621	536,254
Kansas	.....	.....	8[illegible]
Kentucky	787,008	752,512	836,059
Louisiana	381,248	575,342	[illegible]
Maine	327,255	343,339	370,594
Maryland	225,714	219,586	273,241
Massachusetts	282,574	269,994	279,914
Michigan	185,190	274,497	534,267
Minnesota	.....	2,002	119,003
Mississippi	623,197	733,970	720,877
Missouri	433,875	791,510	1,162,284
New Hampshire	275,562	267,910	264,467
New Jersey	220,202	211,261	238,794
New York	1,911,244	1,877,639	1,973,173
North Carolina	617,371	693,510	693,210
Ohio	1,217,874	1,358,947	1,659,850
Oregon	.....	41,729	153,499
Pennsylvania	1,172,665	1,153,946	1,419,493
Rhode Island	36,891	36,262	39,105
South Carolina	572,608	777,686	506,776
Tennessee	822,851	750,762	760,17[illegible]
Texas	.....	930,114	3,503,59[illegible]
Vermont	384,341	348,848	363,91[illegible]
Virginia	1,024,148	1,076,269	1,044,[illegible]
Wisconsin	30,269	183,433	[illegible]
Columbia, District of	3,274	1,040	[illegible]
Dakota	.....	.....	[illegible]
Nebraska	.....	.....	28,[illegible]
New Mexico	.....	32,977	89,[illegible]
Utah	.....	12,616	40,[illegible]
Washington	.....	.....	[illegible]
Total	14,971,586	18,378,857	25,640,337

TABLE II.

showing the relation of the number of neat cattle to the total population, according to the census returns of 1840, 1850, *and* 1860.

States and Territories.	1840.	1850.	1860.
.....	+ 1.13	+ .94	— .81
.....	— 1.94	+ 1.39	— 1.26
.....	.....	+ 2.83	+ 3.87
ut	— .77	+ .57	+ .48
.....	+ .69	+ .58	+ .51
.....	— 2.17	— 2.99	+ 2.74
.....	+ 1.27	+ 1.21	+ .95
.....	— 1.40	+ 1.07	+ .87
.....	+ .90	+ .72	+ .87
.....	+ .88	+ .71	+ .79
.....	.....	.....	+ .81
.....	— 1.01	— .77	+ .72
.....	+ 1.08	+ 1.11	+ .73
.....	+ .65	— .59	+ .59
.....	+ .55	— .38	+ .37
setts	+ .38	+ .26	+ .22
.....	+ .37	— .69	+ .71
.....	.....	— .33	+ .68
i	+ 1.66	+ 1.21	+ .91
.....	+ 1.13	+ 1.16	+ .98
pshire	+ .97	+ .84	+ .81
ey	+ .59	+ .43	+ .34
t	+ .79	+ .60	+ .50
olina	— .82	— .80	+ .69
.....	+ .80	— .69	+ .70
.....	.....	3.14	+ 2.92
ania	— .68	— .50	+ .48
and	+ .35	+ .24	+ .22
olina	+ .96	+ 1.16	+ .72
)	— 1.00	— .73	+ .68
.....	.....	— 4.38	+ 5.79
.....	— 1.35	— 1.12	+ 1.15
.....	— .83	— .76	+ .65
.....	— .98	+ .60	+ .66
, District of	— .07	+ .06	+ .01
.....	.....	.....	— .30
.....	.....	.....	— 1.00
ico	.....	.53	+ 1.08
.....	.....	1.11	+ 1.00
on	.....	.....	2.59
Average per cent	+ .87	+ .79	+ .81

TABLE III.

Statement of the number of milch cows, working oxen, other cattle, total population, and the ratio of the number of neat cattle to the total population, according to the census of 1840.

States and Territories.	Milch cows.	Oxen.	Other cattle.	Total cattle.	Population.	Ratio.
Alabama	189,042	47,261	431,715	668,018	590,756	1.13
Arkansas	40,981	10,733	137,072	188,786	97,574	1.94
California						
Connecticut	74,395	37,197	126,058	238,650	309,978	.77
Delaware	17,179	8,589	28,115	53,883	78,085	.69
Florida	47,395	1,543	69,143	118,081	54,477	2.17
Georgia	276,557	55,311	552,546	884,414	691,392	1.27
Illinois	157,140	57,142	411,992	626,274	467,183	1.40
Indiana	212,618	41,153	366,210	619,980	685,866	.90
Iowa	9,485	5,174	22,390	38,049	43,112	.88
Kansas						
Kentucky	210,554	70,185	506,359	787,094	779,828	1.01
Louisiana	74,006	35,241	272,001	381,248	352,411	1.08
Maine	120,430	65,233	141,592	327,255	501,793	.65
Maryland	75,203	42,307	108,204	225,714	470,019	.55
Massachusetts	110,655	44,262	127,657	282,572	737,699	.38
Michigan	55,189	31,840	98,161	185,190	212,267	.87
Minnesota						
Mississippi	227,721	63,861	431,615	623,197	375,651	1.66
Missouri	126,622	47,881	259,372	433,875	383,702	1.13
New Hampshire	88,218	50,223	136,121	275,562	284,572	.97
New Jersey	97,060	11,199	111,943	220,202	373,307	.59
New York	752,966	194,314	963,964	1,911,244	2,428,921	.79
North Carolina	188,355	30,137	398,879	617,371	753,419	.82
Ohio	486,229	60,779	670,866	1,217,874	1,519,467	.80
Oregon						
Pennsylvania	431,008	51,721	689,936	1,177,664	1,724,033	.68
Rhode Island	15,236	7,618	14,037	36,891	108,830	.35
South Carolina	184,263	17,832	370,513	572,608	594,398	.96
Tennessee	223,887	82,921	516,043	822,851	829,211	.99
Texas						
Vermont	151,814	55,470	177,057	384,341	291,948	1.35
Virginia	285,133	86,786	652,209	1,024,148	1,239,797	.83
Wisconsin	6,808	4,951	18,510	30,269	30,945	.98
Columbia, District of	874	437	1,963	3,274	43,712	.07
Dakota						
Nebraska						
New Mexico						
Utah						
Washington						
Total	4,837,043	1,320,300	8,814,243	14,971,586	17,069,453	.87

TABLE IV.

of the number of milch cows, working oxen, other cattle, total popula-d the ratio of neat cattle to the total population, according to the f 1850.

Territories.	Milch cows.	Oxen.	Other cattle.	Total cattle.	Population.	Ratio.
.....	227,791	66,961	433,263	728,015	771,623	.94
.....	93,151	34,239	165,320	292,710	209,897	1.39
.....	4,280	4,780	253,599	262,659	92,597	2.83
.....	85,461	46,988	80,226	212,675	370,792	.57
.....	19,248	9,797	24,166	53,211	91,532	.58
.....	72,876	5,794	182,415	261,085	87,445	2.99
.....	334,223	73,286	690,019	1,097,528	906,185	1.21
.....	294,671	79,156	541,209	912,036	851,470	1.07
.....	284,554	40,221	389,891	714,666	988,416	.72
.....	45,704	21,892	69,025	136,621	192,214	.71
.....	.....	.....	.....	.....	.....	.....
.....	247,475	62,274	442,763	752,512	982,405	.77
.....	105,576	54,968	414,798	575,342	517,762	1.11
.....	133,556	83,893	125,890	343,339	583,169	.59
.....	86,856	34,135	98,595	219,586	583,034	.38
.....	130,099	46,611	83,284	259,994	994,514	.26
.....	99,676	55,350	119,741	274,497	397,654	.69
.....	607	655	740	2,002	6,077	.33
.....	214,231	83,485	436,254	733,970	606,526	1.21
.....	230,169	112,168	449,173	791,510	682,044	1.16
ire.....	94,277	59,027	114,606	267,910	317,976	.84
.....	18,736	12,070	80,455	211,261	489,355	.43
.....	931,324	178,909	767,406	1,877,639	3,097,394	.60
a.....	221,799	37,309	434,403	693,510	869,039	.80
.....	544,499	65,381	749,067	1,358,947	1,980,329	.69
.....	9,427	8,114	24,188	41,729	13,294	3.14
.....	530,224	61,527	562,195	1,153,946	2,311,786	.50
.....	18,698	8,139	9,375	36,262	147,545	.24
a.....	193,244	20,507	563,935	777,686	668,507	1.16
.....	250,456	86,255	414,051	750,762	1,002,717	.73
.....	217,811	51,285	661,018	930,114	212,592	4.38
.....	146,218	48,577	154,143	348,848	314,120	1.12
.....	317,619	89,513	669,137	1,076,269	1,421,661	.76
.....	64,339	42,801	76,293	183,433	305,391	.60
trict of.....	813	104	123	1,040	51,687	.06
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	10,635	12,557	10,085	32,977	61,547	.53
.....	4,861	5,266	2,489	12,612	11,380	1.11
.....	.....	.....	.....	.....	.....	.....
.....	6,385,094	1,700,694	10,293,069	18,378,857	23,191,876	+.79

TABLE V.

Statement of the number of milch cows, working oxen, other cattle, total population, and the ratio of the number of neat cattle to the total population, according to the census of 1860.

States and Territories.	Milch cows.	Oxen.	Other cattle.	Total cattle.	Population.	Ratio.
Alabama	234,045	92,495	452,643	779,183	964,201	.81
Arkansas	158,873	70,944	318,355	548,172	435,450	1.26
California	198,859	31,527	952,048	1,182,434	305,439	3.87
Connecticut	98,877	47,939	95,091	221,907	460,147	.48
Delaware	22,595	9,530	25,596	57,521	112,216	.51
Florida	92,704	7,787	284,736	385,227	140,425	2.74
Georgia	299,688	74,487	631,707	1,005,882	1,057,286	.95
Illinois	532,731	90,973	881,877	1,505,581	1,711,951	.87
Indiana	491,033	95,981	582,990	1,170,005	1,350,429	.87
Iowa	188,546	56,563	291,145	536,254	674,948	.79
Kansas	26,726	20,133	41,000	87,859	107,207	.81
Kentucky	269,215	108,993	457,845	856,059	1,155,684	.73
Louisiana	130,672	61,008	329,855	521,535	708,002	.73
Maine	147,315	79,792	149,827	376,934	628,279	.59
Maryland	99,463	34,524	119,254	253,241	687,049	.37
Massachusetts	144,492	38,221	97,201	279,914	1,231,006	.22
Michigan	200,635	65,949	267,683	534,267	749,113	.71
Minnesota	40,386	27,574	51,043	119,003	173,855	.68
Mississippi	207,134	104,184	415,559	726,877	791,305	.91
Missouri	345,243	166,588	657,153	1,168,984	1,182,012	.98
New Hampshire	94,280	51,512	118,075	264,467	326,073	.81
New Jersey	138,818	10,067	89,909	138,794	672,035	.34
New York	1,123,634	121,702	727,837	1,973,173	3,880,735	.50
North Carolina	228,623	48,511	416,676	693,810	992,622	.69
Ohio	696,309	61,760	901,781	1,659,850	2,339,502	.70
Oregon	53,072	7,426	93,001	153,499	52,465	2.92
Pennsylvania	673,547	60,371	685,575	1,419,493	2,906,115	.48
Rhode Island	19,700	7,857	11,548	39,105	174,620	.22
South Carolina	163,938	22,629	320,209	506,776	703,708	.72
Tennessee	247,105	104,495	408,574	760,174	1,109,801	.68
Texas	598,086	172,243	2,733,267	3,503,596	604,215	5.79
Vermont	171,698	42,860	149,359	363,917	315,098	1.15
Virginia	330,627	97,860	615,696	1,044,185	1,596,318	.65
Wisconsin	193,996	93,660	225,210	512,866	775,881	.66
Columbia, District of	639	69	198	906	75,080	.01
Dakota	286	348	338	972	2,576	.38
Nebraska	7,125	12,720	8,870	28,715	28,840	1.00
New Mexico	34,461	26,104	29,228	89,793	83,009	1.08
Utah	13,052	9,903	17,369	40,324	40,273	1.00
Washington	10,034	2,777	16,072	28,883	11,168	2.59
Total	8,728,863	2,240,075	14,671,400	25,640,337	31,417,331	.81

Tables I and II we ascertain from actual enumeration the number of
ıtle in each one of the United States for the years 1840, 1850, and
nd their ratio to the population for the several periods; that is, in the
f Alabama every 100 inhabitants kept 113 head of neat cattle in the
340, 94 head of cattle for 1850, and 81 for 1860. Massachusetts, for
.00 inhabitants, had 38 neat cattle in the year 1840, 26 in the year 1850,
1860 had only 22 neat cattle for every 100 inhabitants.
ing the total number of cattle, and comparing it with the total popula-
the United States for the years 1840, 1850, and 1860, and the follow-
ts are found: In 1840, for every 100 inhabitants there were 87 neat
ın 1850, for every 100 inhabitants there were 79 neat cattle, and in
or every 100 inhabitants there were 81 neat cattle.
robably will not be far from the truth to assume that the ratio of cattle
inhabitants in the United States is 80 per cent.; that is, *every hundred require eighty neat cattle.*
the purpose of better understanding the distribution of cattle, we shall
the States into three classes, viz: minimum, medium, and maximum.
inimum class includes those States that have less than the normal
ment of 80 per cent.; the medium class, those that contain between 80
0 per cent.; and the maximum, those States that contain over 100 per
We shall also examine the distribution under three heads, namely, the
ibution of 1840," the "Distribution of 1850," and the "Distribution of

DISTRIBUTION OF NEAT CATTLE IN THE YEAR 1840.

he minimum class (that is, those States which contain less than 80
to every 100 inhabitants) includes the States of Rhode Island, Massa-
ts, Maryland, New Jersey, Maine, Pennsylvania, Delaware, Connecticut,
ew York, being the New England States, except New Hampshire and
nt, the middle States, and Maryland. The western limit of this section
ıded by the Chesapeake bay, the Potomac river, and the western bound-
the State of Pennsylvania. This territory contains the most populous
n the Union, as well as the principal manufacturing and mining districts,
nsequently people must increase at a more rapid rate than cattle can be
ed. The soil is not as easily cultivated, taken as a whole, as in some
ections of the country, and we cannot predicate an increase in the ratio
le to the population, even under more favorable circumstances.
he medium class (that is, those States which contain between 80 and
ttle to every 100 people) includes the States of Ohio, North Carolina,
ia, Michigan, Iowa, Indiana, South Carolina, Wisconsin, and New
ire. This district, with the exception of New Hampshire, is situated
y west of the minimum district. It is about three hundred miles in
and extends in a northwesterly direction from the Atlantic ocean to the
This section may properly be called the eastern division of the great
ltural district of the United States. Cattle will undoubtedly be produced
egion in numbers far exceeding the demands for local consumption for
y s to come. Yet, being so accessible to the people of the minimum
t, it cannot hope to be able to retain its present status. *Cattle will move east and capital to the west* of the Monongahela and Potomac with in-
flow, thus effectually and constantly depleting its vast herds of cattle.
ıne maximum class (that is, those States which have more than 100 cat-
every 100 people) includes the remaining States, namely, that tier con-
our southern and western border, and the State of Vermont. This
ludes the great valley of the Mississippi, the garden of the New
t. At is from this region that the medium class must replenish her de-

creasing numbers, and gather up the immense herds necessary to m demands which come from the more eastern sections of the States. this valley that cattle must be produced for the growing wants of the n

The general law of the distribution of cattle in 1840 is thus very shown. Beginning on our eastern limit, cattle are found in very small n As we move westward they constantly increase, even to our extreme borders. The west has nearly *three* times as many cattle as the east in tion to the number of inhabitants, the smallest ratio being in Rhode Isl Massachusetts, and the largest, nearly six times as great, being in Flo Arkansas.

DISTRIBUTION OF CATTLE IN THE YEAR 1850.

1. During the ten years intervening between 1840 and 1850 we western limit of the minimum class (that is, those containing less cattle to every 100 people) has moved far to the westward of the Poto Monongahela rivers—its position in 1840. It now includes, in additi territory of 1840, the States of North Carolina, Virginia, Ohio, Michig consin, Iowa, Minnesota, Indiana, Kentucky, and Tennessee. The 1840, in ten years, passed over in its westward course at least five miles. It now commences at the southern limit of North Carolina Atlantic coast, and follows the boundaries of that State and Tennes Mississippi river, then up that river to the eastern boundary of Illinoi that to Lake Michigan.

2. The medium class now occupies only the States of Alabama Hampshire. That portion of territory which constituted this class in now mostly dropped to the minimum class. North Carolina has nearly stationary. South Carolina, of all the medium class of 1840, to the maximum of 1850; its per cent. in 1840 was 96, and in 1850 cent. At the same time Massachusetts and Rhode Island have drop 35 and 38 per cent. to 24 and 26 per cent.

3. The maximum class occupies the same position as it did in 1 the exception of Alabama; but those States lying east of the Missis depreciated from an average of 145 per cent. in 1840 to 115 in 18 must expect this portion to occupy a medium position in 1860. Fl South Carolina have made a remarkable increase of their ratios, eleva from 217 and 96 in 1840 to 299 and 116 per cent. in 1850. But ceptions, as well as those of Massachusetts and Rhode Island, bel tioned, are to be explained, not so much by their departure from gen controlling the status of cattle as of men, the States of Florida and So lina not having in this decade the increase of population which mark tory of States in general, and which had occurred in Massachusett Island.

The States west of the Mississippi river have also made a remar crease from an average of 131 per cent. in 1840 to 15[illegible] 1850 F to the head of the list, having 438 per cent.

DISTRIBUTION OF CATTLE IN THE YEAR 1860.

Having in the last decade ascertained the general law of the ratio to the population, it will be more interesting to note the movement f to 1860. We are led to infer a general reduction in the entire count the Mississippi river, with an occasional exception, whilst our great still gather around the pioneers, as, pushing westward, they lay th tions of civilized life in the dominions of the savage.

1. The minimum class remains nearly the same as in 1850. South Carolina now included in this class, while Indiana has risen to 87 per cent. New England and many other States in this class have varied each less than 5 per cent. Vermont and New Hampshire still retain their isolated position, the rst remaining in the maximum class, and the second in the medium. Louisiana as dropped from the maximum to the medium class.

2. The medium class is now found to contain many of the States which, in 850, were in the maximum class. We find Alabama, Georgia, Illinois, ndiana, Kansas, Mississippi, Missouri, and New Hampshire, containing each etween 80 and 100 per cent. Of these States Indiana alone has made a gain, ising from 72 to 87 per cent.

3. The maximum class is mostly found west of the Mississippi river. Florida Vermont are the only States in this class east of it. Texas, California, regon, Washington, Arkansas, Kansas, Nebraska, and neighboring districts ontain the great bulk of this class.

The greatest diminution in this decade has been in South Carolina. That State has lost 44 per cent., Louisiana has lost 35 per cent., and Mississippi 30. The greatest increase has been in Texas, California, Minnesota, Indiana, and Iowa. The supply of cattle in the southwest is far superior to that in the ldle or eastern portion of the country; and although the southern States are ter supplied than the northern States, their main reliance must be on Texas. ne value of this State to the so-called "Southern Confederacy" was not over-estimated.

DISTURBING CAUSES.

Thus far we have considered the distribution of cattle without reference to disturbing causes and deduced great general laws. It is not to be understood that these laws are not to be modified. On the other hand, material modifications do exist, but the great laws must first be ascertained before the modifying circumstances can be applied. I do not in the present article propose to discuss any of the disturbing forces; yet a correct impression of the movement of cattle cannot be conveyed without alluding to one important modification.

The cattle on the Pacific slope, as well as nearly all in Texas, ought to be excluded in considering the excess or deficiency of individual States; for those west of the Rocky mountains are isolated from the United States proper, and those in Texas are mostly wild, or at least not so domesticated as to be driven east in great numbers. Therefore, in discussing the question of demand and supply, or the movement of neat cattle, these sections should be omitted.

This being done, the per cent. of cattle to the people will be reduced from 80 to 68. All those States, therefore, having more than 68 cattle to every 100 people can export, and it is from these States that deficiencies, wherever they exist, can be supplied. The following tables are computed on the basis of 68 per cent. for local use, and show very clearly where the excesses and deficiencies exist, and what the movement of cattle must be to satisfy the demand.

From these tables we find that in four of the New England States there is a deficiency of 785,161 neat cattle, while in Vermont and New Hampshire there is an excess of 190,485, leaving a net deficiency of 594,676 cattle in New England—over half a million.

In the middle States there is a net deficiency of 1,564,526 neat cattle—over a million and a half.

In Maryland there is a deficit of 212,985, which, added to the above, makes a net deficit of 2,372,187—over two and a quarter millions of neat cattle east of State of Ohio. This State has a net surplus of but 46,227 cattle, but could ly spare from ten to fifteen per cent. of her normal requirement for the rn market, and depend on her western neighbors for a supply to take their

TABLE VI.—*Showing the number of cattle of each one hundred people u several States had for exportation in excess of the requisite number, six retained for local use, in the years* 1840, 1850, *and* 1860; *also, the tota for exportation in each State.*

States.	Number of cattle more than is required for local use.			To c e
	1840.	1850.	1860.	
Florida	149	231	206	
Arkansas	126	71	58	
Vermont	67	44	47	
Nebraska	.....	.....	32	
Utah	.....	43	32	
Missouri	45	48	30	
Georgia	59	53	27	
Mississippi	98	53	22	
Indiana	22	4	19	
Illinois	72	39	19	
Alabama	45	26	13	
New Hampshire	29	16	13	
Kansas	.....	.....	13	
Iowa	20	3	11	
Louisiana	40	43	5	
Kentucky	33	9	4	
South Carolina	28	48	4	
Michigan	19	1	3	
Ohio	12	1	2	
North Carolina	14	12	1	
Total	.....	.....	.....	

As this table contains a list of all the States from which cattle can be e we readily perceive the relative value of each State for supplying the de existing in the other States. The total available excess in these Stat close of the year 1860 was 2,552,934 neat cattle.

TABLE VII.—*Showing the number of cattle on hand and the deficiency one hundred people in the several States, and also the total deficienc of the several States, for the year* 1860.

States.	Number of cattle on hand.	Additional number required.	Tota
Minnesota	68	.....	....
Tennessee	68	.....	....
Wisconsin	66	2	
Virginia	65	3	
Maine	59	9	
Delaware	51	17	
New York	50	18	
Connecticut	48	20	
Pennsylvania	48	20	
Dakota	38	30	
Maryland	37	31	
New Jersey	24	44	
Rhode Island	22	46	
Massachusetts	22	46	
Columbia, District of	1	67	
Total deficiency	.....	.....	

The great law of the movement of cattle is here plainly developed. Cattle must be moved eastward and capital westward to supply the pressing demands of our people.

A similar computation made for the years 1840 and 1850 shows also that the net deficit in those States east of Ohio is constantly increasing; and notwithstanding all disturbing causes, the prices of beef, butter, cheese, and milk must gradually become greater, and the supplies for the eastern section of the United States be gathered up from the west in constantly increasing quantities.

WORKING OXEN, MILCH COWS, AND OTHER CATTLE.

Neat cattle are divided into three classes, viz: Working oxen, milch cows, and other cattle. Thus far we have considered the movement of neat cattle in gross, but as each of these three classes is produced for entirely different purposes, it will be necessary to consider them separately, in order to better understand the laws which govern their distribution and movement.

WORKING OXEN.

Table VIII presents the number of working oxen in each State and Territory in the years 1840, 1850, and 1860, and their ratio in comparison with the inhabitants of each State and Territory.

The most obvious law educed by this tabular statement is this: that community demands eight working oxen to every hundred people, irrespective of the number of inhabitants; whether 15,000,000 or 30,000,000. For the past thirty years this number has not varied a single per cent. During the last decade the number has somewhat diminished, and the causes of this diminution are conclusively shown by the table. We find the greatest reduction on the prairie lands of the west. In Iowa the number has fallen from twelve to three per cent.; Illinois, twelve to five; Kentucky, from nine to three; and Michigan, from fifteen to nine. These States have, within the past few years, introduced new and important agricultural implements, thereby greatly facilitating the methods of labor, and diminishing the amount of force derived usually from oxen. Working oxen must, in all prairie lands, soon be supplanted to a great extent by steam, and in those regions we must expect to find, in the present decade, a still greater diminution of their number.

In other agricultural districts less favorable to the introduction of agricultural machinery, on account of the unevenness of the surface, there is a diminution, but not so marked. It doubtless arises from the same cause. On the other hand, in those regions among the mountains where the introduction of machinery for agricultural purposes is almost wholly precluded, working oxen are most abundant. Western Pennsylvania, New Hampshire, and Vermont are examples of this condition of things. In these cold, mountainous regions, the Switzerland of America, neat cattle stand in the maximum class, and working oxen are more numerous than in any other locality east of the Mississippi river, Vermont having nineteen and New Hampshire eighteen per cent. As we follow this mountainous region southwesterly through the United States, we find the ox supplanted by the horse, as in New York, New Jersey, and Pennsylvania; but further south he is supplanted by the mule. From the geological features of the surface, including climate and the physical requirements of these animals, it is inferred that their present distribution cannot be materially changed in many years.

In South Carolina, Pennsylvania, New Jersey, Ohio, Indiana, Florida, Virginia, and Rhode Island, the number of cattle is less than eight per cent., and in no case has varied two per cent. in thirty years. Of those above eight per cent., Tennessee, Louisiana, Georgia, Maine, and Alabama have not varied [illegible] per cent. in thirty years. New York, Maryland, Kentucky, Delaware, [illegible]in, Mississippi, New Hampshire, and Vermont have lost from six

nine per cent. in the last thirty years. Alabama, Arkansas, California, Georgia, Minnesota, North Carolina, and Texas are the only States that have made an increase of their per-centage, and of these Georgia and North Carolina have only made a gain of one per cent.

In comparison with horses, mules, and the more important power, steam, working oxen will show a still less per cent. in most of the older agricultural districts of the United States. In the heavier work of hauling material, in mining operations, and for some manufacturing purposes, and for agricultural purposes in some parts, the ox will doubtless always be retained as the cheapest method of obtaining the requisite power. He will also be an essential aid in the cultivation of new lands, and must necessarily be invaluable on our frontier.

TABLE VIII.—*Statement showing the number of working oxen for the years* 1840, 1850, *and* 1860, *and their relation to the total population for each period.*

States and Territories.	1840.	Ratio.	1850.	Ratio.	1860.	Ratio.
Alabama	47,261	.08	66,961	.08	92,495	.10
Arkansas	10,733	.11	34,229	.12	70,944	.16
California	.....	.....	4,780	.05	31,527	.10
Connecticut	37,197	.12	46,988	.13	47,939	.10
Delaware	8,589	.11	9,797	.10	9,530	.07
Florida	1,543	.06	5,794	.07	7,787	.05
Georgia	55,311	.08	73,286	.08	74,487	.09
Illinois	57,142	.12	76,156	09	90,973	.05
Indiana	41,152	.06	40,221	04	95,982	.06
Iowa	5,174	.12	21,892	.11	56,563	.03
Kansas	.....	.....	.....	.....	20,133	.10
Kentucky	70,185	.09	92,274	.06	108,909	.03
Louisiana	35,241	.10	54,968	.11	61,008	.11
Maine	65,233	.13	83,893	.14	79,792	.13
Maryland	42,307	.09	34,135	.06	34,524	.05
Massachusetts	44,262	.06	46,611	.05	38,221	.03
Michigan	31,840	.15	55,350	.14	65,949	.09
Minnesota	.....	.....	655	.11	27,574	.15
Mississippi	63,861	.17	83,485	.14	104,184	.13
Missouri	47,881	.13	112,168	.16	166,568	.14
New Hampshire	51,223	.18	59,027	.19	51,512	.16
New Jersey	11,199	.03	12,070	.02	10,067	.01
New York	194,314	.08	178,909	.06	121,702	.03
North Carolina	30,137	.04	37,309	.04	48,511	.05
Ohio	60,779	.04	65,381	.03	61,790	.03
Oregon	.....	.....	8,114	.61	7,426	.14
Pennsylvania	51,721	.03	61,527	.03	60,371	.03
Rhode Island	7,618	.07	8,139	.06	7,857	.05
South Carolina	17,882	.03	20,507	.03	22,629	.03
Tennessee	82,921	.10	86,225	.09	104,491	.09
Texas	.....	.....	51,285	.24	172,243	.28
Vermont	55,470	.19	48,577	.15	42,816	.14
Virginia	86,786	.07	89,513	.06	97,862	.06
Wisconsin	4,951	.16	42,801	.14	93,660	.12
Columbia, District of	437	.01	104	.01	69	.01
Dakota	.....	.....	.....	.....	348	.14
Nebraska	.....	.....	.....	.....	12,720	.44
New Mexico	.....	.....	12,557	.20	26,104	.31
Utah	.....	.....	5,266	.46	9,303	.25
Washington	.....	.....	.....	.....	2,777	.25
Total	1,320,300	+ .08	1,700,694	— .08	2,240,075	+ .07

MILCH COWS.

rence to an article published in the Agricultural Report of 18
ption of Milk," it will be found that about fifty per cent
uced in the United States is directly consumed as food, ar
is manufactured into butter and cheese. It will also be
one-half of the butter and cheese is consumed by the mar
least seventy-five per cent. of the milk produced is consur
ility of its production.

nstitutes the principal demand for cows, and as nothing
e, the demand can only vary with the population. This
the following statement, which gives + 27 per cent. i
irement for the past thirty years. Nothing could be m
n all the varying circumstances that have occurred, whil
ur territory and our population, the constant demand h
ght cows to every one hundred people. In 1870 the dem
but from the constant decrease of neat cattle in general
y, the number actually reported by the census of 1870 m
nty-seven.

rkable feature in the distribution of milch cows is seen by
rn with the northern section of the country. At no time
years has any southern State, with the exception of
and North Carolina, had less than the required number of
wenty-eight for every one hundred people. On the con
er cent. is far above. At the same time, Maine, Massachus
onnecticut, New Jersey, Pennsylvania, Delaware, Mary
chigan, Minnesota, Tennessee, Virginia, and Wisconsin h
within the past thirty years, had the average number of m
husetts and Rhode Island have not one-half the average
In these States this deficiency is undoubtedly partly made
g of a better breed; but it is more probable that in thes
of the milk is used for food, and the butter and cheese su
rces. We also find that Florida, Georgia, Alabama,
, Arkansas, Tennessee, and Kentucky have largely dimin
f milch cows in the past ten years. In general, all of tl
e United States has largely diminished its stock of cows,
plied than the northern sections. In the north, Connect
sachusetts, Maryland, New Hampshire, New York, Nortl
nia, and Virginia have all, with the exception of New
York, less than the requisite number, and have varied
rs less than two per cent. Iowa, Indiana, Wisconsin, an
iderably increased their stock, and doubtless the central
than supply the east with the required amount of butter.

The following tabular statement shows the distribution and movement for the years 1840, 1850, and 1860:

TABLE IX.

Statement showing the number of milch cows for the years 1840, 1850, *and* 1860, *and their relation to the total population for each period.*

States and Territories.	1840.	Ratio.	1850.	Ratio.	1860.	Ratio.
Alabama	189,042	.32	227,791	.30	234,045	.24
Arkansas	40,981	.42	93,151	.45	158,873	.36
California	4,280	.05	4,250	.05	198,859	.65
Connecticut	74,395	.24	85,461	.23	98,877	.21
Delaware	17,189	.22	19,248	.21	22,599	.20
Florida	47,395	.87	72,876	.83	92,704	.66
Georgia	276,557	.40	334,223	.37	299,688	.28
Illinois	157,140	.33	284,671	.35	532,731	.31
Indiana	212,618	.31	284,554	.29	491,033	.36
Iowa	9,485	.22	45,704	.24	188,546	.28
Kansas					26,726	.25
Kentucky	210,554	.27	247,475	.25	269,215	.23
Louisiana	74,006	.21	105,576	.20	130,672	.18
Maine	120,430	.24	133,556	.23	147,315	.23
Maryland	75,203	.16	86,856	.15	99,463	.14
Massachusetts	110,655	.15	130,099	.13	144,492	.12
Michigan	55,189	.26	99,676	.25	200,635	.27
Minnesota			607	.10	40,326	.23
Mississippi	127,721	.34	214,231	.35	207,134	.26
Missouri	126,622	.33	230,169	.34	345,243	.29
New Hampshire	88,218	.31	94,277	.30	94,880	.29
New Jersey	97,060	.26	118,736	.24	138,818	.21
New York	752,966	.31	931,324	.30	1,123,634	.29
North Carolina	188,355	.25	221,799	.25	228,623	.23
Ohio	486,229	.32	544,499	.28	606,309	.30
Oregon			9,427	.71	53,072	1.01
Pennsylvania	431,008	.25	530,224	.23	673,547	.23
Rhode Island	15,236	.14	18,698	.13	19,700	.11
South Carolina	184,263	.31	193,244	.29	163,938	.23
Tennessee	223,887	.27	250,456	.25	247,105	.22
Texas			217,811	1.02	508,086	.99
Vermont	151,814	.52	146,198	.47	171,698	.54
Virginia	285,153	.23	317,619	.22	330,627	.21
Wisconsin	6,808	.22	64,339	.21	193,996	.25
Columbia, District of	874	.02	813	.02	639	.01
Dakota					226	.11
Nebraska					7,125	.25
New Mexico			10,635	.17	34,461	.42
Utah			4,861	.43	13,053	.32
Washington					10,034	.90
Total	4,837,043	— .28	6,385,094	+ .27	8,728,862	— .

OTHER CATTLE.

This class, although important, and one from which the other two are solely derived, we have not deemed of sufficient interest in this discussion to present in a tabular statement of distribution and movement.

CATTLE IN TIME OF WAR.

iscussion properly ends in the year 1860, inasmuch as the distribution int had proceeded solely from the wants and interests of the people in ace and quiet. But when the public peace is disturbed, and property insecure or valueless in certain sections, when the yeomanry of the re called by millions from the plough to the sword, from the arts of he arts of war, when so vast a standing army is to derive its food, to xtent, from the cattle of the country, it is evident that this element of ood and strength will be found acting under new laws, to be found in l from a sense of security of property and the public necessity, rather eretofore in individual interest. We must therefore discuss the dis- and movement of cattle since 1860, as presented in the loyal and States.

CATTLE IN THE LOYAL STATES.

discussion we can only consider those States loyal which have not had ized rebel force formed within its limits. With this restriction the loyal e those States lying north and east of the State of Missouri, the Ohio mac rivers, and the Chesapeake bay. The cattle north of this line been disturbed by any extraordinary causes, except in a few counties ie short invasion of Pennsylvania by Lee.

rity, as in times of peace, has reigned. Nothing has occurred from can predict any sudden or unexpected movement of neat cattle. The tion of cattle is gradually gaining on production; but the general ten- the last decade was to increase the ratio of cattle in the west, on the s well as on the western side of the Mississippi river. From the fact e could no longer be obtained from the rebel States, we infer that st have been a large increase in the production of neat cattle in the t in the past three years. In the eastern section of the loyal States not have been much change.

yal States, at the commencement of the rebellion, were wholly cut off great southwestern herds of cattle. There remained to them but few hich had sufficient numbers for their own demands.

erence to Tables VI and VII we find that there are but 951,894 neat those States which had an excess for exportation, while at the same e was an aggregate deficiency in the remaining States of 2,669,264, net deficit of 1,517,370 neat cattle. Other modifying causes, as the on of beef, must increase rather than diminish this deficiency. The cattle became at once an important question, and doubtless it will be seen ose States there is now a larger supply of young cattle than ever before This young stock cannot immediately supply beef, butter, cheese, and the increasing demands of the eastern sections, and consequently these f food must bear still higher prices.

ime in the United States has the value of neat cattle been so important. t deficiencies existing in the eastern sections, the extensive facilities ction in the western, together with the existing ample means for trans- , must inseparably connect these sections by the strongest of com- ies.

war progresses, and the government gradually regains possession of ritory and opens communication with the north, those sections formerly l by great herds of cattle will be found to be depopulated. What have consumed by the rebels will have been driven off by them for safety. ill be left to us only the west, in our own parallels, from which to make leficiency that may exist.

The valley of the Mississippi north of Cairo must constitute the great source from whence the north and east will derive their neat cattle, beef, butter, cheese, and milk for years to come.

CATTLE IN DISLOYAL STATES.

At the close of the year 1860 the southern States were all well supplied with neat cattle. But one or two States were found in which there was a deficit, and where this existed, it was very small indeed. On the other hand, most of these States had a very large surplus. This section of the United States as a whole was overstocked with cattle. In this respect no country could have been better prepared for rebellion. By reference to Tables VI and VII it will be seen that there was a net surplus of 1,553,151 neat cattle within their borders.

In the beginning of the year 1861 the entire northern line of these States felt the shock of war. A cordon of armed men was drawn from the Atlantic to the Rocky mountains, through which cattle could not pass. During this year the greater portion of the southern people enjoyed quiet, and their peaceful homes were undisturbed. Neat cattle could not have been materially affected, and at the close of the year this section of the country could not have diminished its stock of neat cattle sufficiently to have justified any serious anticipations of a deficiency in their supply of beef, butter, cheese, and milk.

The year 1862 opened with a general movement of the armed forces on the northern borders of the rebel territory, and cattle began to move southward. Less attention was paid to the cultivation of the soil, and the great army of the south fed upon its vast herds of cattle. The armies of the north encroached more and more, and consumed all which had not been removed. Nevertheless the close of this year found cattle in abundance in much the larger portion of rebel territory.

The year 1863 produced greater changes. Armed men no longer existed as a cordon on the northern parts of the rebel territory. Kentucky and Tennessee were passed over, the Mississippi valley occupied by northern men, and the territory of the south sundered. Texas, Arkansas, Missouri, and Louisiana could not be said to have been under the direct and entire control of the rebels. Cattle, negroes, and rebels were pressed within less than one-half the territory occupied by them in 1861. The result of this aggregation must have been to have caused the consumption of a large portion of their neat cattle. The ordinary routine of plantation life now had been seriously disturbed, if not effectually destroyed. A large increase of slave population from Kentucky, Tennessee, and the northern parts of Mississippi, Alabama, Georgia, and Virginia, had to be fed, while at the same time they were not as productive as in their former condition. Raids of armed men penetrated the interior of rebel territory from all directions, and at the close of this year there had been a great change within the rebel limits. These causes, together with the extravagant prices prevailing within their borders, and the general deficiency in the ordinary articles of food, must have made a great reduction in their stock of cattle before the opening of the year 1864.

While this condition remains, the agriculturist must close his researches in this direction, and not till peace, prosperity, and happiness regain their proper sway can he hope to pursue his investigations with success.

)GY AND ORNITHOLOGY OF NEW ENGLAND,

WITH REFERENCE TO

AGRICULTURAL ECONOMY.

BY E. A. SAMUELS, BOSTON, MASSACHUSETTS.

of so many years ago, and its truth so clearly demonstrated by
ient naturalists and scientific men of the present time, that the
ılly and wisely provides laws, and also instruments to enforce
r a beautiful and just equilibrium in the elements and workings
ıaintained, is scarcely, as yet, felt and recognized in its proper
by those most practical and, from the nature of their occupation,
:ssional of all naturalists—the farmers. They hardly appreciate
'act, notwithstanding all that has been written and is being writ-
on the subject, that, although numerous elements are created in
ıre continually acting against them and their interests, other ele-
ıvided to operate against the workings of these enemies; and if
friendly are not interfered with, they will, to a very great ex-
ct the evil effects of the others.

and the workings of the various forces that are acting for or
; is not necessary that the agriculturist should possess a complete
the several branches of natural history; but it is important that
e a general knowledge of the subject, that he may, at least, be
;uish who are his enemies and who his friends; and it is the duty
st, and those who make the study of nature in her various forms
) simplify and generalize the study, that all who are interested
.tion to agricultural economy may become acquainted with the
omena, their causes and effects, without spending valuable time
;ation of details.

adopted to maintain the proper equilibrium are, of course, differ-
: from those in inanimate nature. In the latter, elements are em-
ınteract or neutralize the effects of other elements; while in
e rapacious tribes are created to destroy or prey upon other inju-
ɔut that these rapacious animals shall not extirpate the others,
ı certain extent useful in different ways, they are slow in multi-
the others increase with sufficient rapidity to prevent extinction
natural enemies. Although a knowledge of inanimate nature in
ɔrms is undoubtedly of great importance to the success of agri-
te nature possesses the greatest interest to the farmer, both because
lirect influence upon his success, and the objects in it are gene-
to him and best capable of being understood by him.

r terrestrial animated nature, or fauna, therefore, and analyzing
to consist of four great classes—mammals, birds, reptiles, and
characteristics of each of these classes are, of course, familiar to
y be described briefly as follows: Mammals are warm-blooded
imals that suckle their young. They are viviparous—that is,
:th their young alive.

Birds are warm-blooded vertebrate animals clothed with feathers; they are invariably oviparous—that is, the young are hatched from eggs by the action of heat imparted from the body of the parent bird.

Reptiles are cold-blooded vertebrate animals; they are oviparous, the young being hatched by the heat of the sun.

Insects are those articulate animals which undergo changes, called metamorphoses, before the perfect animal is formed; these changes are three in number after the eggs are laid: first, the caterpillar stage; second, the pupa stage; and after these the imago or perfect insect stage.

The study of the first class is called mammalogy; that of the second, ornithology; the third, herpetology; and that of insects entomology.

The study of entomology is undoubtedly of the greatest importance to the agriculturist, but the present paper will not treat of it otherwise than in a general description of the characteristics of the different orders, and incidentally in the enumeration of destructive species which furnish food for some of the mammals and birds. Herpetology is of but little importance to the farmer, as we have but few species of reptiles, most of which are, however, beneficial.

The present paper is designed not so much to add new facts to the knowledge of our mammalogy and ornithology, but to emphatically reiterate important facts and observations in these departments for the benefit of the agriculturist; the object being to impress upon his mind the fact that nature furnishes powerful assistants to his labors, and to show him the manner in which they operate.

Beginning with the great class mammalia, we find it divided by naturalists into different classes called orders, each of which is distinguished by peculiarities in structure, habits, and food. Those orders indigenous to this country among the terrestrial mammalia of importance to the agriculturist, either as beneficial or injurious, are: Cheiroptera, (the bats;) Insectivora, (the insect devouring animals;) Carnivora, (the flesh devouring animals;) Rodentia, (gnawing animals;) Marsupiata, (pouched animals;) and Ruminantia, (animals which chew the cud.) Of these animals the Cheiroptera, Insectivora, and Carnivora are beneficial; the Rodentia are generally injurious; and the Ruminantia are valuable only as food, and are (to a slight extent) injurious in the wild state.

CHEIROPTERA.

In this order are included those animals known as the bats; there are several species in the United States, all of which can be properly included in the family *vespertilionidæ*, the characteristics of which are an excessive prolongation of the fingers of the anterior extremities, which are connected together, and with the posterior extremities, which are connected with the tail by a thin, semi-transparent, generally naked membrane, which enables them to fly. Their food, which they almost always capture in the night, (as the habits of the animals are strictly nocturnal,) consists entirely of insects, chiefly nocturnal lepidoptera, which they seize while on the wing. The number of these noxious insects which they destroy is immense; and this fact, together with their harmless dispositions and habits, establishes them as valuable friends to the farmer, who should encourage them to take up their abode on his premises, and protect them as much as possible. At the approach of cold weather, the bats seek convenient quarters in caves, hollow trees, and buildings, where they remain torpid until spring, suspended by the sharp hooked claws of their feet.

INSECTIVORA.

Of this large and important order we have many representatives included the two families, *Soricidæ*, (shrews,) and *Talpidæ*, (moles.) The shrews may readily be distinguished by their mouse-like form, long and pointed head,

e eyes, and attenuated muzzle, prolonged into a movable snout. In the ypical shrews, included in the genus *Sorax*, the body is rather slender, ylindrical, and covered with a soft glossy fur; the ears are large, but oncealed by the fur of the head; the eyes are minute, but visible; and it is elongated, flexible, and sensitive; the tail is variable in length, but y is long; series of glands are placed along the flanks which secrete a disagreeable odor, in consequence of which they are seldom destroyed n by the *Carnivora*.

animals of this family are small, some of them the most diminutive of ls. Their habits are generally nocturnal, and none of one species hiber- elieve, as individuals are often seen in winter busily engaged in search- insects in their various forms, in and beneath piles of stones and rubbish. ews inhabit the woods, fields, and gardens, and being possessed of vora- petites they are continually active in destroying numerous noxious insects, h their food almost entirely consists; consequently they are all eminently al to agriculture, and are certainly worthy the protection of the farmer. e are also in this country, besides the genus *Sorex* or true shrews in- in the *Soricidæ*, other genera, of which *Blarina* is the most important. genus are placed the mole-shrews or short-tailed shrews. These may gnized by their stout body, short tail, and the other features of the genus

family *Talpidæ* (or moles) is represented in this country by several in all of which the body is short and strong, the snout flexible and very e, and the head is long and tapering. The external ear is wanting, and is so small as to be hardly visible, or is completely covered with the the head. The limbs are short and strong, (the forward ones which are d with strong claws for digging,) exceedingly so. These peculiarities are all adapted to the subterranean habits of these animals. Their food of insects and worms; these, which they destroy in great quantities, or nearly so, captured beneath the surface of the ground. They are constantly employed in searching for food in consequence of their vora- petites, and their labors are valuable in destroying these insects.

viewing the habits of the different animals that subsist entirely upon we find them to be generally nocturnal in character. This seems to be rovision of nature, whereby the birds (generally diurnal in habits) which great numbers of insects, and even in a great many species, subsist upon them, are continually assisted in keeping reduced this formidable tructive element. Another interesting and valuable fact is, that these , to make their work the more sure, hunt in different circles: the *Ves- idæ* destroying great numbers of insects in the air; the *Soricidæ* on ace of the earth, and the *Talpidæ* beneath the surface. In studying autiful laws, so nicely calculated for so desirable an end, we admire and . Appreciating them, and noting their efficacy, we learn to respect and ve the instruments by which they are executed.

CARNIVORA.

great order, generally diffused over the entire globe, is represented in ntry by the following families: *Felidæ*, (the cats;) *Canidæ*, (the dogs;) æ, (the civet cats;) *Mustelidæ*, (the weasels, skunks, &c.;) and *Ursidæ*,

external characteristics of the *Felidæ* are—a rounded head, light, elastic, body, strong limbs and sharp *retractile* claws on all the toes, which are number on the anterior feet, and four on the posterior. In this family uded our panthers, lynxes, and wildcats. The habits of these animals a nocturnal and diurnal, but generally the former. In capturing their

prey they always spring suddenly upon it from some concealed station, a
they fail in their first attack they seldom repeat it. By nature they are
ardly and cruel; they are gifted with acute senses of sight and hearing;
are only beneficial in destroying many of the injurious herbivorous mamm
and it is a doubt whether or not the damage they inflict by destroying
numbers of beneficial birds and valuable ruminants, does not more than b
the little good they do. At any rate, the hatred all farmers have for them
great that they lose no opportunity to destroy them, and, probably, this o
their prejudices is founded on reason.

In the family *Canidæ* are included our wolves and foxes; the same re
will apply to them as to the cats regarding their usefulness.

The family *Viverida* has no importance to our agriculturists.

The family *Mustelidæ*, in which are placed our martins, weasels, ot
badgers, and skunks, is the most important of the Carnivora to agriculture.
characteristics are based principally on peculiarities of the teeth, of which t
animals have six incisors in each jaw; two canines; six or eight pre-mol
two molars in the upper, and two or four in the lower jaw. Their bodie
generally long and slender; legs short; feet, five-toed, provided with
sharp claws; the tail is generally long, and sometimes bushy, as with
skunks. These animals generally have glands at the root of the tail w
secrete a liquid of offensive odor. With the skunks this secretion is used
weapon of defence; its offensive odor exceeds anything in nature. The we
and skunks are the most important members of this family; they are contin
active in destroying the mice and rats; the form of the weasels being pecul
adapted to following them to their most secret haunts. Insects also for
inconsiderable portion of the food of skunks and weasels. Birds, and
eggs, and young, are often destroyed by them, but not to an extent at all
ancing the benefit they do; nor is the injury caused by an occasional raid
the poultry yard at all comparable to the immense benefit we receive from
unceasing nightly labors in the destruction of rats, mice, and insects.
otters and badgers are of no importance to agriculture.

The *Ursidæ*, in which are included our raccoons and bears, are omniv
in nature, although they are placed by naturalists in the Carnivora. In
sequence of their depredations in the cornfields and sheepfolds they are
favor with the farmers, who improve every opportunity to destroy them.
little can be said of their benefit to agriculture. In closing the order Carni
it would be proper to say that these animals are slow to multiply. If this
not the case, they would, in consequence of their voracity, exterminate the
animals on which they subsist, (and which are also valuable as food for
and thus defeat the object for which they were created.

RODENTIA.

A knowledge of the characteristics and habits of the animals of this ord
of great importance to the agriculturist, from the fact that these animals
stitute one of the most destructive elements with which he has to contend.
properly understand these characteristics, it will be necessary to enter in
more careful and less general examination of these animals, and trust l
external peculiarities than we have thus far done; and we will, as far as p
ble, simplify these examinations, that they may be brought within the com
hension of all who have not already made the subject a study.

The animals of this order are all of small size, the beaver and marmots b
among the largest. The species are all very prolific and numerous, and al
destructive, some exceedingly so. The prominent characteristics of t
animals is the peculiar formation of the teeth. These are of two kinds, inc
and molars; the canines are wanting; the incisors are generally two in nu

t each jaw; they are large and powerful, and provided with sharp, cutting, hisel-shaped edges, adapted to gnawing. The constant severe action to which hey are subjected would in time destroy them were they not continually grow- ng, or being replaced by a pulpy secretion at their bases. The molars vary in r from twelve in the upper, and ten in the lower, to but two in each jaw; ike the incisors, are composed of two substances; an external layer of enamel, and a softer material in the interior; their surfaces are irregular culated, adapted for grinding vegetable substances. These teeth are aced in the same manner as the incisors.

The forms and habits of the animals in this order are of a great variety. They rill be discussed in the descriptions of the different families, of which we have l country five. They constitute each a natural group, with generally fa- r representatives. They are called the *Sciuridæ*, (the squirrels;) *Sacco- idæ*, (the pouched rats and gophers;) *Muridæ*, (rats and mice;) *Hystricidæ*, cupines;) and *Leporidæ*, (rabbits and hares.) The detailed peculiarities of e families cannot be, in the present paper, discussed at great length, but ose most prominent will be mentioned sufficiently to have them understood.

The *Sciuridæ* of the United States are included in the two natural divisions r sub-families *Sciurinæ*, (squirrels and woodchucks;) and *Castorinæ*, (beavers.)

The sub-family *Sciurinæ*, in which are placed the squirrels, both ground arboreal, the wood-chucks and spermophiles, is very numerous in this y, and the members of it are generally injurious, from the fact that the reat bulk of their food, of which they generally secure large quantities for winter subsistence, consists principally of the various seeds, nuts, and rains which are valuable as a means of subsistence to man and the domestic nimals. These animals also consume great quantities of cultivated fruits, and ven vegetables, to an extent, in some districts, involving to the farmer con- rable pecuniary loss. Wood-chucks, especially, are very mischievous, not in what they eat, but to the crops of clover, grass, and grains, which are yed by numerous trails or paths leading from their burrows. This family or small value, either for food or for their fur.

The *Castorinæ*, or beavers, are of no great importance, economically speak- g, to agriculture. They are valuable for their fur, which always commands ready sale at a high price. These animals are rapidly becoming extinct, and e only found in the wildest and most retired districts of the country.

In the family *Saccomyidæ* are included all the gophers and pouched rats. hey may be readily distinguished by their large cheek pouches. These ani- als are all eminently injurious. They burrow in the earth in grain fields and lands, and often do considerable mischief by visiting the gardens, orchards, nurseries, where they eat the roots of the plants and gnaw the bark from e trees. In this manner large numbers of fruit trees are destroyed yearly. he cheek pouches are used in conveying food to their burrows. This food s of roots, grains, grasses, seeds, fruits, and nuts. Of these they devour quantities. Various methods have been devised for their destruction, the successful being by poison. Great numbers are destroyed by the carni- us animals and birds, and were it not for these they would, in consequence numbers and rapid increase, be a serious pest. These are, however, d in New England.

The great family *Muridæ* is, economically speaking, the most important in igenous *Rodentia*. In it are included the rats and mice, all of which rious, in some genera, seriously so. These animals have characteristics Com n, but they naturally fall into several groups, which possess peculiari- itly marked to rank them as sub-families. They are called the , (jumping mice;) *Murinæ*, (rats and mice proper;) and *Arvicolinæ*, d field mice.)

In the sub-family *Dipodinæ* we have but one genus, *(Jaculus,)* in this c
These animals are readily distinguished from the field mice by their ve
posterior limbs and tail, and their progression by long leaps. This genu
a large one, and consists in this country of but one or two species. Tl
not abundant in any districts, and can hardly, from their retiring habi
the nature of their food, which consists largely of the seeds of wild pla
called greatly injurious. Their number will probably be kept reduced
carnivora and reptiles,

The sub-family *Murinæ* is largely and widely distributed. It is charac
by a robust body, moderately short limbs, strong and fully developed c
and the tibia and fibula are united below. The anterior feet are four-toe
a wart-like tubercle supplying the place of a thumb; the posterior feet
toed; the tail is generally long, and covered more or less thickly with
which are arrayed in whorls, and between which spring scanty hairs
partially conceal them. In this sub-family are included our common r
decumanus, (Pallas;) black rat, *M. rattus*, (Linn.;) common mouse, *M.*
cultus, (Linn.;) the field mice, *(Rithrodon;)* the white-footed mice, *(Hesper*
the bush rats, *(Neotonia;)* and the cotton rats, *(Sigmodon.)* These
are all injurious generally in the highest degree. In the fields and g
in the grain houses and hay ricks, their depredations are innumerable, a
farmer has to pay for their support a large share of his produce.

These species are all prolific and numerous, and their rapidly inc
numbers are already a serious evil. They should be destroyed at ev
portunity. The farmer will find that he will have able and willing ass
in their destruction in one or two small terriers if he keeps them ab
premises. They are as natural enemies to the rat tribe as the cats are,
constantly and successfully on the alert for them. In conclusion we c
that, with the exception of the *Arvicolinæ*, to be treated of next, they
most injurious of all mammals.

The animals included in the sub-family *Arvicolinæ* are certainly the n
jurious of all farm pests, excepting the insects. They are divided int
genera, *Arvicola*, (field mice;) *Fiber*, (muskrats;) and *Myodes*, (Lem
Of these, the last mentioned are not of much consequence agriculturally.
the animals in the genus *Arvicola* that constitute one of the greatest
nuisances. They are characterized, and may be readily distinguishe
rat-like, but rather stout, form; short ears, nearly concealed in the fur
head and short tail. They are known in different sections by the name
mice, short-tailed field mice, bull-head mice, and bear mice. These anin
numerous, in some districts extremely so, and prolific to an alarming
and exceedingly voracious. In summer they live in the cultivated fiel
meadows. In this season they eat the different grains by cutting do
stalks to get at the ears. They also eat the roots and seeds of the d
grasses and clover, and devour carrots, turnips, and other vegetables.
barns and hay ricks they spoil the hay by cutting it into fragments and
it with their peculiar odor, thus rendering it unacceptable to the cattle.

Robert Kennicott, who has obtained a rich fund of knowledge of the
of these animals, wrote a most invaluable report on them, which was pu
in the Patent Office Report for 1856. I cannot refrain from giving a
tracts from it here, which the importance of the subject justifies. He s

"Few if any escape their depredations, though the full amount of damage done is but little known, and yet they are usually thought unworthy of consideration.

* Muskrats are very mischievous among crops which lie near their haunts, but th
to be utterly exterminated by every means in the farmer's power, on account of the
and unceasing injury in cutting through dams and embankments, breaking the
ditches, and burrowing in, through, and across drains, opened and covered. No mo
should be shown them than to the pestilent field-mouse.

armers as cut their corn and leave it standing in shocks for some time in the field, as is ally done here in Illinois, will find upon examination that in many, if not in every one of shocks, there may be found one or more pair of meadow mice, which have dug for themves burrows in the ground beneath, and have often carried thither a store of corn; while these, or ensconced in the protecting cornstalks above, they have built themselves a net, which they can lead a very comfortable sort of life, regaling themselves when hungry upon he corn. Now, a pair of mice will not, it is true, eat enough corn to alarm a farmer for the afety of his crop; but let any one examine a large field of corn thus cut and left standing n the ground a month or two where these mice abound, and carefully estimate the average mount of corn destroyed in each shock, observing that which has been buried in the burow, and then multiply that by the number of shocks inhabited by these pests, and it will e often found that they have consumed or destroyed a large amount. In meadows they do nuch injury by devouring the roots and stems of timothy, clover, and other plants used for ay."

"In a nursery where apple seeds were planted in autumn I have observed that, during all and spring, so many of the seeds were dug up by these mice as to leave long gaps in the ows of seedlings, the empty shells of the seeds being found lying about the rows from which hey had been taken. They congregate in stacks of hay and grain, sometimes in exceedingly great numbers, destroying all the lower parts by cutting galleries through them in every direction."

"The greatest mischief done by meadow mice is the gnawing of bark from fruit trees. The complaints are constant and grievous, throughout the northern States, of the destruction of orchard and nursery trees by the various species of arvicolæ. The entire damage done by them in this way may be estimated, perhaps, at millions of dollars. If any think this too large an estimate, let them inquire, even in a small neighborhood, where much attention is paid to fruit-growing, and it will be found that, wherever they abound, the injuries committed by these pests are frequently among the most serious difficulties encountered by the pomologist. This is especially the case at the west, where no care is taken to protect the trees against them, careless orchardists allowing grass to grow about the roots of their fruit trees, and thus kindly furnishing the arvicolæ with excellent nesting places in winter, and rendering the trees doubly liable to be girdled. In the nurseries in northern Illinois I have seen whole rows of young apple trees stripped of their bark for a foot or two above the ground. Thousands of fruit trees, as well as evergreens and other ornamental trees and shrubs, are at times thus killed in a nursery in one winter. The mice are most mischievous in winters of deep snow. It is usually thought that they only gnaw bark when no other food is to be obtained; but it is more probable that this is palatable to them at all times. Confined specimens, while abundantly supplied with food of all kinds, ate the bark from twigs placed in their cage. One reason why fruit trees are most girdled in times of deep snow is, that the meadow mice can then best move about at a distance from their burrows, being protected by the snow, under which they construct numerous pathways, and are thus enabled to travel comfortably in search of food, always to be obtained in abundance where there is any kind of perennial grass or the seeds of annual plants. Aided by the snow, too, they climb up at the sides of the trees to gnaw the bark at a considerable height from the ground. Rabbits are often accused of gnawing the bark from trees, when the mischief has really been done by meadow mice."

If the *Arvicolinæ* had not numerous enemies they would soon become unbearably numerous, for they are all very prolific, rearing several litters of from five to seven in each, yearly. They are destroyed by all the carnivora and rapacious birds. Indeed, some species subsist almost entirely upon them. The animals most efficiently active against them are the *Mustelidæ* and some of the large snakes. These, if protected by the farmer, and they should be, would do much to keep these pests reduced in numbers. They can readily enter the burrows of the mice, and, possessing voracious appetites, destroy great numbers. t the farmer, the moment he sees a snake, no matter if it is perfectly harm- (and but few are venomous,) kills it, thus destroying one of his greatest ctors, living as it does on insects principally, but often catching these . Domestic cats are also extremely fond of them, and destroy great num- . In spite of all this destruction *Arvicolinæ* are still abundant.

"Our farmers kill the small birds of prey with a zeal that would be highly lable if exhibited in a better cause, while the man is rarely found who not kill the harmless mouse and insect-eating snakes, with as much as he would destroy the really objectionable rattlesnake, which is the ,' ıomous reptile on the prairie of Illinois and other western States." one of our prairie farmers who regards these pests as "inoffensive little mice

that only steal a few kernels of corn" investigate their habits carefully for
year, and he will be very apt to conclude that meadow-mice are a kind of
stock that are "hardy and excellent breeders," but rather expensive to
It may be, he will think it best to forbid killing, too, on his farm the p
hawks, owls, and shrikes, as well as harmless snakes.

Before dismissing the destructive family *Muridæ*, it will be proper pe
to mention some of the methods that have been adopted on the farm for
destruction, or to prevent their ravages. Numerous traps have been de
some of them ingenious and effective. Of these, the best I have seen—
for barns and granaries and another for the fields—are as follows: Place
barrel half full of water beneath a trap-door in the floor of buildings inf
with these animals, so that the top of the barrel will be just on a level with
floor; around this scatter grain or meal at night, and by morning
will have fallen in and been drowned. In the fields and nurseries where
abound, a trap made on the favorite Scotch plan is very effective. Dig in
earth at the beginning of cold weather short trenches four feet wide at
bottom, and three feet wide at the top, and about four feet deep; the ends
clined at the same angle as the sides. The earth walls of these trenches
becoming frozen, are impassable to mice that have fallen in, as they will
great numbers. I am informed by a Scotch gardener, that he has
upwards of *nine thousand* in one winter in this manner.

Different poisonous preparations have been used with effect on these vermin
The following are among the best: two ounces of carbonate of barytes mixe
with one pound of suet or tallow; place portions of this within their holes an
about their haunts. It is greedily eaten, produces great thirst, and deat
ensues after drinking. This is a very effective poison, as it is both tasteles
and odorless. Mix one ounce of finely powdered arsenic and one ounce of la
with meal into a stiff dough; put it about the haunts of the rats; they will e
it greedily, and it makes them so thirsty that they will die near the water,
which they drink until they burst. Other effective poisons are composed
follows: make a paste of one ounce of flour, one-half gill of water, one drach
of phosphorus; or, two ounces of lard, half a drachm of phosphorus, and o
ounce of flour; or, one ounce of flour, two ounces of powdered cheese-crumb
and one-half a drachm of phosphorus; add to each of these mixtures, if co
venient of access, a few drops of oil of rhodium. Mix into a paste or pills, a
scatter about the fields and nurseries. Or, two ounces of finely powdered
senic, two ounces of lard, ten drops of oil of rhodium, mixed with flour or me
into a thick dough, and pills of it scattered about the orchards and nu

In the family *Hystricedæ* are comprehended the porcupines, &c. Of
we have but two species included in the genus *Erethizon;* they are the wh
haired or Canada porcupine, *E. dorsatus*, (Cuv.,) and the yellow-haired por
pine, *E. epixanthus*, (Brandt.) These animals are not numerous or troubl
they are injurious only in destroying trees, of which they eat the bark and
Sometimes these trees are found stripped almost entirely of bark, and it
that a single porcupine will thus denude a hundred trees in a season
also eat fruits and vegetables, but not to any great extent.

In the family *Leporidæ* are included our rabbits and hares. Their chara
teristics are: long and erect ears; large and prominent eyes; four incisors
the upper, and two in the lower jaw; the two middle ones in the upper j
much the largest; posterior limbs long and strong, adapted to leaping; anter
feet five-toed; posterior feet four-toed; tail short or wanting. Some of
animals in this family are injurious in gardens and nurseries to an extent har
appreciated. I have known acres of peas to be destroyed in a few weeks wh
situated near small swampy woods, in which these animals for the most
reside. Fruit trees are often injured by them, sometimes seriously, by ta
ing the bark in winter from the trunk; cabbage fields are also visited

, and great damage done. Fields of clover, of which they are fond, are l and cut up, if they are near woods, to an extent only known by the farmer. I have seen many of these fields with well-beaten paths run- all directions made by the rabbits and woodchucks. The *Leporidæ* are olific; were they not they would soon be exterminated, for they furnish man, and are destroyed in great numbers by the carnivorous animals, lly lynxes, weasels, and foxes,) rapacious birds, and reptiles.

RUMINANTIA.

nimals of this order have peculiarities that constitute this a very natu- p. They have in all the families the following common characteristics: ors in the upper jaw, their place being supplied by a callosed gum; cisors in the lower jaw; generally twelve molars in each jaw; feet . These animals, as their name indicates, *chew the cud;* that is, they e their food a second time. The manner in which this is done is as Their stomach is compound, being composed of four different compart- The food, which is always vegetable in nature, is but little chewed ssed into the first or largest compartment called the "paunch." From sses into the second compartment, from which it returns to the mouth is completely masticated, and then passed to the third stomach, from he fourth, and thence to the intestines.

s order are found two of our most valuable domestic animals—horned d sheep. These animals, in their order indigenous to this country, are in but two families; *Cervidæ* in which are placed our moose, elk, and l *Cavicornia* which includes the goats and bison. The *Cervidæ* are shed by solid deciduous horns; the *Cavicornia* by permanent hollow These animals are all valuable for food, and for their hides, of which kinds of leather are made. They are generally wild and retiring in bits, seldom approaching human habitations. The deer in some districts rious by visiting corn and grain fields, which they eat and destroy, s to a considerable amount. They also injure young fruit trees in by biting off the twigs and gnawing the bark. The thoroughness ich they have been hunted has driven them into the most retired and ttled districts, and the time is not far distant when they will be extinct t the unsettled territories of the continent.

MARSUPIATA.

s curious order, which does not, however, exist in New England, are those animals the young of which are brought forth prematurely, and in most instances, into a peculiar pouch situated on the lower part of men of the female. This order is represented in this country by the s, which are confined to the southern and middle States. The follow- esting account of them is given by Goodrich in his "Illustrated Natu- ry." He says of the common American opossum:

a pointed head, wide gape, numerous sharp teeth, a rough tongue, ears large and all eyes, the tail long, tapering, flexible and prehensile; the toes are armed with ng, curved claws. Its size is nearly that of a cat, but the form is low and squat; s a grayish-white; the face near the snout pure white; the ears black. In its mostly nocturnal and arboreal, feeding alike upon insects, eggs, small birds, and sometimes invades the barn-yards and destroys the poultry, it is said, for their is a good deal hunted, and manifests much dexterity in escaping by creeping l the grass, and sometimes pretending to be dead. In defending itself it bites It is sluggish in its movements, and will sometimes lie on its back for hours. It ends itself from the branch of a tree by its tail. It is very prolific, producing from n at a birth. The young at this period are well formed, and weigh from three to each. As soon as produced they are shoved into the pouch by the mother with

her snout, and pushed near the nipples, which they find and grasp by instinct. Their growth is very rapid: at a week old they weigh thirty grains. They remain in the pouch attached to the nipples till they are able to move about."

In winter, if the climate is cold, the opossums become sluggish, but not torpid, like the woodchucks.

INSECTS.

Before proceeding to a consideration of the characteristics and habits of our native birds, it will be necessary to give a brief general description of the different orders of insects, which constitute a large proportion of their food. It will not be necessary to enter into details regarding species, more than to mention those most injurious, or to select familiar species as types of the various families. We found in the introductory description of insects that they all undergo certain changes or *metamorphoses* after being hatched from the egg. This peculiarity briefly describes, or rather distinguishes, animals of this class from all others. The different orders into which they are divided are also based upon characteristics which place them in seven natural groups readily distinguished: they are called Coleoptera, (beetles;) Orthoptera, (cockroaches, crickets, grasshoppers, &c.;) Hemiptera, (bugs, locusts, plant-lice, &c.; Neuroptera, (dragon flies, lace-winged flies, May flies, &c.;) Lepidoptera, (butterflies and moths;) Hymenoptera, (saw flies, wasps, bees, ants, &c.; and Diptera, (mosquitoes, gnats, flies, &c.)

The Coleoptera (literally sheathed wings) include some of the most injurious insects of the farm. The characteristics of this order are that the wings "are covered and concealed by a pair of horny cases or shells, meeting in a straight line on the top of the back, and usually having a little triangular or semi-circular piece, called the scutel, wedged between their bases."—(Harris.) Some families in this order are carnivorous, and, consequently, beneficial; these are the *Cicindeladæ*. (tiger beetles;) *Carabidæ*, (predaceous ground beetles;) *Dytiscidæ*, (diving beetles;) and the *Coccinelladæ*, (lady birds or lady bugs, as they are often called.) The *Cicindeladæ* may be recognized by the metallic lustre of their wings and bodies, their agile movements, and the habit of frequenting sandy roads and dry sandy fields, "starting from under the feet of the traveller with a swift and noiseless flight, only to alight a few feet ahead, facing about to meet the threatened danger as they touch the ground. This operation is often repeated several times before they will take refuge in the grass or other herbage." The *Carabidæ* are generally pretty well known, as are also the *Coccinelladæ*. The *Dytiscidæ*, or diving beetles are aquatic insects; they destroy multitudes of those insects that pass through their first transformation in the water.

Nearly all the other families of the order *Coleoptera* are injurious; among them are found the *Scarabacidæ*, (tree beetles, dung beetles, dor beetles, May bugs, and rose bugs, or beetles properly,) which subsist upon the leaves of trees, shrubs, &c.; the *Cetoniadæ*, (flower beetles;) the *Lucanidæ*, (stag beetles, horn bugs, flying bulls, &c.;) the *Buprestidæ*, (saw-horned beetles,) the larvæ of which are injurious to trees; they are called "wood-eaters or borers." Our forests and orchards are more or less subject to their attacks, especially after the trees have passed their prime. "Some of these beetles are known to eat leaves and flowers, and of this nature is probably the food of all of them. The injury they may thus commit is not very apparent, and cannot bear any comparison with the extensive ravages of their larvæ." The *Elaterida* (spring beetles,) which may be distinguished by their habit of jerking themselves upward and over when laid on their backs; their larvæ are also tree borers; the *Rhynchophoridæ*, (weevils,) which may be known by their lengthened snouts, are injurious by attacking plums and other fruits, grains, and seeds; the *Cerambycidæ*, (borers,) which may be known by their habit, when

nto the hands, of producing a squeaking noise "by rubbing the joints thorax and abdomen together." These beetles are called the Capricorn ; their larvæ are the most powerful and destructive of our borers. The *ididæ*, (oblong leaf beetles;) *Hespidæ*, (little leaf beetles,) and other ing beetles, included in several families, are also very injurious. Those estructive among them are the striped cucumber beetles that attack and other vines, and the various flea beetles that attack the leaves of , &c. The *Cantharidæ*, (blistering beetles,) are also injurious to vege- For full and accurate descriptions of the above insects and those men- hereafter, see Harris's "Insects Injurious to Vegetation," published by islature of Massachusetts in 1841 and 1852, and republished and illus- n 1862.

ORTHOPTERA.

insects of this order, with the exception of the family *Mantidæ*, (camel s,) are injurious to agriculture. They may be recognized by their t wings when folded along the back, "being covered by a pair of thicker ke members." In this group are included the grasshoppers, locusts, s, cockroaches, and others of this description. Their food consists of ruits, the leaves and bark of trees, and shrubs. In some sections these are exceedingly numerous, and they inflict a great amount of damage. re greedily eaten by the various insectivorous mammals and most of ls; snakes also capture them in great numbers.

NEUROPTERA.

order includes all those insects known as dragon flies, darning needles, litters, and all the others that have the peculiar *nerved wings* of these . These insects are all beneficial; they are carnivorous, or rather ra- , and subsist entirely upon other insects, principally Lepidoptera, of hey destroy great quantities.

HEMIPTERA.

insects of this order are all injurious; they are distinguished by having, of jaws, like the three preceding orders, "a slender beak, which, when se, is bent under the body, and lies upon the breast between the legs. strument consists of a horny sheath, containing in a groove along its rface three stiff bristles as sharp as needles. Bugs have no jaws, but sucking the juices of animals and plants, which they obtain by piercing ith their beaks." Some of these insects have no wings, like the com- l-bug. Probably the most noxious insects of this order are found in *idæ*, of which the grain aphis, or grain louse, so well known in this of late years, is the type. The *Coccidæ* (bark lice) are also very in- to trees.

LEPIDOPTERA.

insects in this order are all very destructive, principally in the cater- rm. The different butterflies and moths are included in it, and their eristics are well known, their name is suggested by the manner in heir wings are clothed with scales; these are exceedingly minute, re- a dusty substance when rubbed off the insects on the finger. The of the apple-tree moth are probably the most injurious in this order, h ror a few years past the army worm, the caterpillar of *Leucania* , (Haworth,) has created great damages in grain and grass fields.

HYMENOPTERA.

s l ects, like the bees, wasps, &c., "having four membraneous wings, , and a sting in the extremity of the abdomen, belong to this order,

together with the ants, gall-flies, ichneumons, and almost all the parasitic tribes which deposit their eggs in the eggs or larvæ of others." They are generally beneficial. The greatest exceptions are the saw flies, *(Tenthredinidæ,)* the *Uroceridæ*, (boring or wood-wasps,) and the *Cynipidæ*, (gall flies.)

DIPTERA.

In this order are included those insects that have but two wings, and instead of jaws, have a mouth adapted to sucking. The different flies are placed in this group. These are both beneficial and injurious; in fact their habits and food are of a great variety. "Some subsist upon the blood of living animals; others on fungi; many construct galls in various annuals. The blow fly and others of that class live upon putrefying matter; the common house fly passes its preparatory stages in excrement; the *Tachinidæ* glue their eggs on the skin of various caterpillars, and their larvæ enter and devour the juices of the animal resembling the ichneumon in their habits; some are said even to attack and feed upon the eggs and bodies of spiders, the traditional enemies of the race, thus consummating a species of just retribution. The Hessian fly, the wheat midge, the onion fly, and others, are among the most noxious of insects. The black fly, *(Simulium,)* the mosquito, *(Culex,)* the golden-eyed forest flies, *(Chrysops,)* the *Tabanidæ*, or horse flies, and others, are the cause of intense annoyance and irritation, during the hot months, to both men and animals." Summing briefly the habits of these insects, we find that the *Coleoptera* are generally injurious in the larvæ state by boring into trees; the *Orthoptera* are injurious by feeding upon the leaves of trees, shrubs, and grasses; the *Neuroptera* are beneficial by destroying noxious insects; the *Hemiptera* are injurious by sucking the juices of plants, trees, &c.; the *Lepidoptera* are injurious chiefly in the caterpillar form, by eating the leaves of trees, &c.; and the *Hymenoptera* and *Diptera* are both beneficial and injurious, but rather incline to the latter quality.

BIRDS.

The most concisely emphatic treatise that could be written in favor of our native land birds would be the statement of the fact that, with the exception of most of the diurnal birds of prey, they are all beneficial to agriculture; and if this fact were recognized by the farmers, (than whom none are more affected by its existence,) and if they were to extend their protection and encouragement to these benefactors, the grain and fruit crops of this country would be the value of millions of dollars greater than they are. A few familiar illustrations will show the importance of protecting birds on the farm.

It is the custom in some districts of this country, as soon as the planting is finished, and other spring work done on the farm, for all the men, both old and young, to assemble together, with guns, &c., and after choosing sides, as the expression is, to have what is called a "shooting match;" that is, each party endeavors to kill the greatest amount of birds and animals within the circuit of several miles, or within the limits of the county. Such a match came off in a town in Pennsylvania a few years since. The party was numerous and the slaughter immense; in fact nearly all the birds were killed off, and as the migrations had passed—this was about the last of May—scarcely a bird was to be seen in the neighborhood the ensuing summer. The result was, the cut-worms ravaged the cabbage fields; the apple-tree caterpillars and borers were so numerous that whole orchards were destroyed, and army worms and other injurious insects were so abundant that there was scarcely a single grain field that was not damaged to the extent of at least one-third the value of the entire crop. Nor were these injuries confined to that year, but many succeeding seasons bore witness to the folly and wickedness of that wholesale destruction.

On another of these occasions, "about the year 1820, in North Bridgewater, Massachusetts, the birds were killed in such quantities that cartloads of them were sold to the farmers for fertilizing the soil. There was consequently a great scarcity of birds in all that vicinity. Soon the herbage began to show signs of injury; tufts of withered grass appeared, and spread out widely into circles of a seared and burnt complexion. Though the cause and effect were so near each other, they were not logically put together by the inhabitants at that time. Modern entomology, however, would have explained to them the cause of this phenomenon in the increase of the larvæ of injurious insects, usually kept in check by the birds which had been destroyed at that shooting match." These are not isolated cases, nor even rare instances. Let the curious student consult local newspapers from the different sections of the country in the spring months, and he will find many instances of these shooting matches, with long accounts of the different birds and animals destroyed.

In Europe a similar system of extermination is prevalent, and seems to be steadily on the increase. Frederick de Tschudi, the president of the Agricultural Society of Canton St. Gall, Switzerland,* writes of this practice as follows:

"But the cause which exercises a still more fatal influence on the diminution of our most useful birds of passage is the extraordinary hunt they are subjected to on the part of the Italians. It is a well known fact that, at the period of their spring migrations, and still more in autumn, Italians are seized with a mania for killing small birds. Men of all ages and conditions—nobles, merchants priests, artisans, and peasants—all abandon their daily tasks to attack, like banditti, the troops of passing visitors. By the river-side, in the fields, all around is heard the report of fire-arms; nets are laid, traps set, twigs covered with bird-lime hung on every bush. On every hill adapted to the purpose is placed a sort of trap, (*roccolo*,) full of owls and sparrow-hawks, to attack and slaughter the little stranger." "To form some idea of the slaughter which for weeks together is the chief delight of the population of Italy, it is sufficient to mention that in one district on the shores of the Lago Maggiore the number of small birds annually destroyed amounts to between 60,000 and 70,000, and that in Lombardy, in one single *roccolo*, 15,000 birds are often captured daily. In the neighborhood of Bergamo, Verona, and Bresca, several millions of birds are slaughtered every autumn. We cannot prevent the Italians from indulging in their absurd and barbarous amusements, but we can lessen the evil in some degree, and it would be but consistent with the proverbial good sense of us Germans if we were to protect all the bird tribe with a solicitude proportionate to the mad attacks upon them southwards, and thus in some degree reinstate the order of nature, and aid in re-establishing the necessary balance between the insect world and its enemies."

Unfortunately the destruction of valuable birds by our farmers is not confined to their shooting matches, but on many farms the boys are provided with guns l ammunition, and instructed to destroy those birds which are traditionally injurious, such as the robin, common crow, blackbirds, thrushes, and numerous others, all of which are beneficial.

The investigations of ornithologists and other students of nature have within a few years disclosed interesting and valuable facts regarding this branch of ural economy, showing the importance of the subject to be far from trivial. It vill not be necessary in this paper to enter into an extended consideration of hese investigations, but the most important facts obtained by them will be resented, together with such suggestions as are appropriate.

In the great class—birds we find groups possessing peculiarities of form, habits, food sufficiently marked to place them in permanent natural orders. Of se, our land birds, important to agriculture, are included in the following: *aptores*, (birds of prey;) *Scansores*, (climbers;) *Insessores*, (perchers;) *Rases*, (scratchers;) and *Grallatores*, (waders.) The characteristics of these ers are well marked and easily distinguished.

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* Translated by Henry L. B. Ibbetson, in the Ohio Agricultural Report for 1862.

RAPTORES, (LITERALLY, ROBBERS.)

The birds of this order are divided into two groups, the diurnal and the nocturnal birds of prey. The eagles, hawks, &c., are included in the former, and the owls in the latter. The diurnal birds of prey are generally characterized by their strong, hooked bill, and long, sharp, curved claws, called talons; lateral eyes, "with lashes surrounded by a naked or woolly orbital circle; the feathers above, below, and behind the eyes directed backwards, as on the rest of the head;" nostrils opening in the cere. The owls are distinguished from the others by their "eyes directed forwards," more or less completely surrounded by a crown of radiating bristly feathers; lores and base of bill densely covered with bristly feathers directed forwards; the nostrils opening on the anterior edge of the cere; a crown of peculiarly formed feathers on the side of the head and above the throat; head fully feathered; plumage very soft and downy." These characteristics are recognized by the most prominent ornithologists of the day.

The diurnal birds of prey are divided into two families, *Vulturidæ*, (vultures.) and *Falconidæ*, (falcons.) The *Vulturidæ* are represented in this country by but three or four species, of which only two are of any importance to agriculture. They are the turkey buzzard, (*Cathartes Aura*, Linn.,) and the carrion crow, (*C. atratus*, Bartram.) These are only beneficial as scavengers, their food consisting of dead animal matter, usually in a state of decomposition. These birds are mostly confined to the southern States, where they are protected in most districts by the usage of the people. In habits they are filthy and indolent, and in consequence of their good treatment by man they are much more familiar and tame than any of our other birds of prey. They are not found in New England, and do not require a more extended mention here.

In our *Falconidæ* are included all our falcons, hawks, and other diurnal birds of prey. They are divided into numerous sub-families, of which the following are of importance to agriculture: *Falconidæ*, (falcons.) *Accipitrinæ*, (hawks,) *Butoninæ*, (buzzards,) *Milvinæ*, (kites, &c.,) and *Aquilinæ*, (eagles.) In the first of these sub-families are included our true falcons, of which the pigeon hawk, (*Hypotriorchis columbarius*, Linn.,) and the sparrow hawk, (*Tinnunculus sparrerius*, Linn.,) are familiar types. These birds are of rapid flight, and always seize their prey while on the wing. They accompany the migrations of the other birds, and prefer wooded countries to the more open districts. They cannot be called beneficial, as their food consists almost entirely of small birds and sometimes reptiles. The *Accipitrinæ* includes our hawks, of which the gos hawk or slate-colored hawk, (*Astur atricapillus*, Bonap.,) and the sharp-shinned hawk, (*Accipiter fuscus*, Bon.,) are well-known representatives. The birds, like the preceding species, are of powerful and rapid flight. They are generally resident with us throughout the year; they subsist almost entirely upon small birds, and are consequently injurious. The *Buteoninæ* or buzzards of the United States are generally well known. The red-tailed buzzard or hawk, (*Buteo borealis*, Vieillot,) and the red-shouldered buzzard or winter hawk, (*B. Lineatus*, Jardine,) are well known in many districts by the name of hen hawks. They are injurious, their food consisting chiefly of small birds and reptiles, which they often seize while on the wing, but generally pounce upon from a tree or other elevated position. Their flight is usually a succession of soaring sweeps, often at a great height.

The birds of the *Milvinæ* are beneficial. In this sub-family are placed our kites and harriers. Of these, the swallow-tailed hawk, (*Nauclerus furcatus*, Vigors,) and the marsh hawk, so well known and abundantly distributed throughout the continent, are familiar types. The former of these species subsists almost entirely upon injurious insects, and the marsh hawk destroys immense numbers of field mice, (*Arvicolinæ*,) which are found to be very

jurious. In the *Aquilinæ* are placed our eagles, of which the golden eagle, *Aquila canadensis*, Cassin,) the bald or white-headed eagle, *(Haliætus leucocalus*, Savigny,) and the fish hawk or osprey, *(Pandion carolinensis*, Bon.,) e well known. The golden eagle is not abundant in this country. Its food nsists principally of the larger *Rodentia* and birds. It seldom eats carrion, it prefers to capture its own prey. The white-headed eagle subsists almost irely upon fish, which it robs from the osprey, or finds cast upon the shore. also destroys some of the larger birds and mammals. The osprey is of no ortance, economically speaking, to agriculture, as its food consists entirely nsh, which it captures while on the wing by diving into the water and ching it with its talons.

We find, therefore, that the diurnal birds of prey are not beneficial, or are inrious, with but two or three exceptions, namely, the swallow-tailed hawk, rsh hawk, and osprey. The first and last of these species are well known d require no description here, and that the marsh hawk may be recognized by e farmer, I have thought it proper to give the following brief unscientific scription: The adult bird is of a cinereous blue color above, and on the ad and breast beneath, and the upper tail coverts, white; there are numer- spots of reddish brown on the feathers of the abdomen. This description necessarily general, as the object is to secure the identification of the bird ile in the air. It may also be known by its frequenting the marshes almost tirely, a habit none of our other hawks have that could possibly be mistaken this species.

The *young* birds in the plumage of the first or second year will be much re difficult to identify. They are of a dark brown above, except *the upper l coverts, which are white.* The knowledge of this fact will be of material istance in the identification of the bird, as this white patch on the rump ows plainly in the young and old birds while in the air.

Our nocturnal birds of prey, or *Strigidæ*, are divided into several wellrked sub-families. It is not necessary in this paper to refer to their peculiar aracteristics, as they are all beneficial, some of them greatly so. These subilies are called the *Striginæ*, of which the barn owl, *Strix pratincola*, nap.,) so well known in the southern States, is the type; the *Buboninæ*, rned owls,) of which the great horned owl, *Bubo virginianus*, (Bon.,) is well own over the entire continent; the *Syrninæ*, (gray owls,) of which the great ereous owl, *Syrnium cinereum*, (Aud.,) is the typical representative; the *heninæ*, in which are included our different burrowing owls; and the *ctininæ*, (day owls,) of which the snowy owl, *Nyctea nivea*, (Daudin,) is a iliar representative.

The food of owls consists almost entirely of rats, mice, and field-mice, *icolinæ*. Many of the smaller species destroy multitudes of nocturnal in- ts, (chiefly *Lepidoptera*,) and but few of the birds are destroyed, comparaly, by any of the species. Those that are most diurnal in habits partake ewhat of the nature of the hawks, and kill birds which they pursue and ture while on the wing. But the little injury done by these is but trifling en compared with the benefits they are constantly doing by destroying the ious animals, which, as I have already said, constitute the great portion of ir food.

SCANSORES.

The birds of this order, greatly dissimilar in characteristics and form, are dily distinguished by the peculiar formation of their feet, which have two in front, and almost always two behind, (a few exceptional cases have but hind.) This arrangement is admirably adapted to enable these birds to trees, to which their habits are nearly confined, and in which they usually their food, which consists in the different families of insects, fruits, and

seeds. This order is divided into several groups, each with marked peculiarities of habits and form. Those represented in New England are the *Cuculidæ* (cuckoos) and *Picidæ*, (woodpeckers,) both of which are of importance to our agricultural interests.

The cuckoos, of which we have but two species, the yellow-billed cuckoo, *Coccygus americanus*, (Bonap.,) and the black-billed cuckoo, *C. erythropthalmus*, (Bon.,) are eminently beneficial, notwithstanding their bad practice of sucking the eggs of smaller birds when met with. Their food consists almost entirely of noxious insects, chiefly the hairy caterpillars, which nearly all the other birds refuse to eat. These caterpillars are the larvæ of some of the most injurious *Lepidoptera*, of which the well known apple-tree moth is a familiar type. In destroying these larvæ the cuckoo may be often seen standing on the branch on which their tent-like nest is made, or upon the nest itself, tearing it with its bill; the swarming inhabitants are exposed, when the bird, seizing by the head insect after insect, gives them a shake, or beats them against the branch, and swallows them. Thus a large nest is soon depopulated, the bird returning several times a day until none of the pests are left.

In the *Picidæ* are placed all our woodpeckers, all of which are among our most beneficial birds. They may be distinguished from the other *Scansores* by their sharp, wedge-shaped bill, which is strong and adapted to digging, together with their undulating flight, and habit of alighting on the trunk of a tree and rapidly moving sideways or otherwise along the bark, supported by the stiff feathers of the tail. These subsist almost entirely upon the larvæ of the injurious beetles, the *Scarabacidæ*, *Buprestidæ*, *Cerambycidæ*, and others which live in the trunk and limbs of trees. In procuring these the woodpecker is guided by its keen sense of hearing in detecting their presence, when a hole is bored or dug by a succession of powerful blows of its beak; the long barbed tongue is introduced, and the grub withdrawn. The injury these insects do to our fruit and forest trees may be safely estimated at millions of dollars annually in the United States; and as we know their ravages would be unchecked were it not for the woodpeckers, who are their principal enemies, we should at least extend our protection to these birds, if not encourage their presence. It is not necessary here to discuss the habits and characteristics of the various subfamilies of these birds. They are generally arboreal, and their nest is built in holes and excavations in trees made by the birds for the purpose. The eggs are pure white in color.

Some of our species are migratory, but most are resident in the same locality throughout the year.

INCESSORES, (PERCHERS.)

Passing from the *Scansores*, we come to the great order *Incessores*, or percher from the Latin word signifying to perch. The birds in this order, although possessing the greatest dissimilarity in character, have one peculiar characteristic in common, viz: they have almost invariably three toes in front, and one on the same level behind the foot, adapted to perching. These birds although possessing in common this feature, are so entirely different in form and habits, that they have been divided into several great natural sub-orders and these into families. The characteristics of the sub-orders represented in this country are given by Professor Baird as follows:

"STRISORES.—Toes, either three anterior and one behind, (or lateral,) or four anterior, the hinder ones, however, usually versatile or capable of direction more or less laterally forward. Tail feathers never more than ten, the first long."

"CLAMATORES.—Toes, three anterior and one posterior, (not versatile.) Primaries always ten, the first nearly as long as the second. Tail feathers usually twelve."

"OSCINES.—Toes, three anterior, one posterior. Primaries, either nine only, or if ten the first usually short or spurious."

In the first of these sub-orders are included our humming birds, (*Trochilidæ*,) swifts, and chimney swallows, (*Cypselidæ*,) and goat suckers, so called, (*Caprimulgidæ*.)

These birds are all very beneficial. The humming birds of the United States are of some importance to agriculture. Their beautiful forms and plumage, and their familiar habits have endeared them to the farmers, who pitied them, and even encouraged their presence in various ways. Their food consists principally of small insects which harbor in flowers; these they capture by thrusting their long tongues into the flowers, and securing them by the action of the saliva.

Our chimney swallows, familiar representatives of the family *Cypselidæ*, are very beneficial in consequence of the immense numbers of insects they destroy. These birds are almost constantly on the wing from early dawn until late in the night, and the noxious insects which entirely compose their food, are always taken while flying. They seem to constitute, with the other swallows and night-flying insectivorous birds, the extreme outer circle for the destruction of the insects, apparently created to secure those which have escaped their other enemies on or near the earth. They should be protected and encouraged instead of destroyed, as too many are by the superstitious or ignorant, who drive them from their dwellings because of the absurd belief that they bring ill luck. This is but one of the ridiculous fancies too prevalent among our rural population at the present enlightened period.

In the *Caprimulgidæ* are included our whip-poor-will and night hawk. These birds are almost entirely nocturnal in habits; they subsist entirely upon nocturnal insects, mostly *Lepidoptera*, of which they destroy great numbers. There is an absurd notion prevalent in some districts of the United States that the whip-poor-will sings on the door step of a dwelling-house, it foreruns the death of some member of the family in that house. This belief has caused the destruction of multitudes of these birds, the farmer or others almost always killing them whenever met with. It is almost incredible to what an extent these absurdities are carried, and if they were harmless they would be ludicrous; but unfortunately they are not. The mole is killed because, if it runs against the leg of a cow, she will go lame. The toad is destroyed because it spits in the eyes of cattle and blinds them. Snakes are invariably killed because they are disagreeable looking, and so on in all cases, to the damage of the farmer, for these animals are his friends, and are continually active in his interests.

CLAMATORES, (SCREAMERS.)

The families in this order in the United States are the *Alcedinidæ* (kingfishers) and *Coleopteridæ*, (fly-catchers.) The former of these families is of no importance to agriculture, as the birds subsist entirely upon fish, which they capture by diving for them in the water while on the wing. It is in the *Coleopteridæ* that we find some of the most valuable and beneficial birds to agriculture that we have. The king bird, *Tyrannus carolinensis*, Baird, and the pewees are familiar types of this family, and their habits are so well known that it is hardly necessary to give them further mention here. Their food consists entirely of insects, which they capture while on the wing, not in the manner that swallows practice, and which is necessary from their conformation, but in and among the trees, where they destroy immense multitudes of noxious *Lepidoptera*, and often *Orthoptera*. In capturing these insects, the fly-catchers remain perched on the tree until they fly into the air, when the birds pounce upon them and destroy them. They constitute the next circle to the swallows in the cordon surrounding the insect world.

OSCINES, (SINGERS.)

In this order are placed the *Turdidæ*, (thrushes;) *Sylvicolidæ*, (warblers;) *Hirundinidæ*, (swallows;) *Bombycillidæ*, (chatterers;) *Laniidæ*, (shrikes;) *Liotrichidæ*, (mocking birds, wrens, &c.;) *Certhiadæ*, (creepers;) *Paradæ*, (titmice;) *Alaudidæ*, (larks;) *Fringillidæ*, (finches, sparrows, &c.;) *Icteridæ*, (blackbirds, troopials, &c.;) and *Corvidæ*, (crows, jays, &c.)

The family *Turdidæ*, of which our common robin *Turdus migratorius* Linn., is a familiar representative, includes all our true thrushes. These birds are all beneficial, although they occasionally eat the smaller fruits and berries; their food consists principally of the larvæ of insects, which they obtain either on the surface of the ground or just beneath it. I cannot refrain from introducing the following extract from an essay on the utility of birds,* by Wilson Flagg. This gentleman is one of the most careful and intelligent observers of the habits of our birds, and his experience as it is given in this essay is interesting and valuable. He writes as follows:

"One circumstance that attracts frequent attention in the feeding habits of the thrushes is their apparent want of diligence; but this appearance is delusive, for the immense quantity of insects consumed by them could not be obtained without proportional industry. The common robin will exemplify the general habit of the thrushes, though he carries their peculiarities to an extreme. When he hunts his food he is usually seen hopping listlessly about the field. Sometimes a dozen or more robins may be seen in one field, but they are always widely separated. Observe one of them and you will see him standing still with his bill inclined upwards and looking about him with seeming unconcern. Soon he makes two or three hops, and then stands a few more seconds apparently idle. Presently he may be seen pecking vigorously upon the ground, when, if you were near enough to see it distinctly, you would find that he is pulling out a cut-worm from his retreat, or devouring a nest of insects which are gathered in a cluster. Last summer, (1861,) having been confined nearly all the season to the house by illness, I had ample opportunity to watch the habits of the few birds that could be seen from my windows. These were chiefly robins, bobolinks, grakles and other blackbirds, as well as multitudes of sparrows. Though a continual warfare was waged against the grakles by the owners of the fields, I saw enough to convince me that they were warring against their own friends and servants. The robins were very numerous and familiar in my neighborhood, (the west end of Somerville and North Cambridge.) One pair had a nest very near my house, and were rearing a second brood in the month of July, when the soil was so greatly parched by drought, that if robins lived only upon berries and earth-worms they must have starved to death. I had often seen these birds at a distance pecking vigorously upon the sward, and then drawing out a worm. I knew that there were at this time no earthworms near enough the surface to be within the reach even of the long-billed snipes; but when the bird was near enough, I could distinctly see, by the form and appendage of the creature, that it was invariably a cut-worm of a large species, and of an olive green color. The female bird was the most industrious. She would carry off one of the grubs as often as once in five minutes, whenever I watched her movements, and very often she would have two in her bill at a time. One day, close under my window, I saw her bear off three cut-worms at once, all of which were taken before my sight in a space of about a rod square. Never did I see at any time an earthworm in the mouth of this bird during this month, nor anything else except cut worms, of which this single pair must have destroyed an incalculable number. The old birds probably swallow all the hard insects, and save the larvæ exclusively for the young."

In dismissing the thrushes, I would call attention to a very valuable and interesting paper on the food of the robin, written by Professor Jenks, and published in the proceedings of the Massachusetts Horticultural Society for 1858–'59. This gentleman is one of our most careful students of ornithology and his researches are worthy of attention.

The *Sylvicolidæ*, of which the Maryland yellow throat, *Geothlypis trichas*, (Cabanis,) and the yellow warbler or summer yellow bird, *Dendroica æstiva*, are familiar illustrations, are also very beneficial to agriculture. They constitute the next line in the war against the insects to the fly-catchers. We found those birds to destroy the insects that fly among and from trees and shrubs,

* Proceedings of the Essex county (Massachusetts) Agricultural Society for 1861.

rs hunt for them *in and among the foliage.* Their food consists
? these pests, and they are employed almost continually in their
ı. The family *Hirundinidæ*, in which are included our swallows,
ell known and appreciated in this country, much more so, generally,
ther birds. Indeed, so great favorites are they in some sections that
s so far encourage them or permit their presence as to provide com-
uses for them, or allow them to nest in their barns and other build-
s same remark will apply to these birds as to the *Cypselidæ*, except
tter are partly nocturnal, and the others entirely diurnal; their food
flying insects which they obtain while on the wing. The cedar
ımon cherry bird, *Ampelis cedrorum*, (Baird,) is the best known of
cillidæ; and, taking this bird for the type of the family, so far as
concerned, we cannot but say they are beneficial; for, although in
season this bird is a nuisance to pomologists, it much more than
the damage it thus does by destroying myriads of caterpillars and
ous larvæ, besides capturing many insects on the wing. From the
ıy until September the cedar bird is found in our orchards, where
s nest and rears its young; here it finds an abundance of its favorite
e-tree caterpillars. The number of these insects that one of these
in a day is beyond all calculation; it is for the farmer to watch it
ı minutes, when he will be satisfied that the destruction of one of
; on the farm would be a direct loss to him.
niidæ, in which are included our shrikes *(Laniinæ)* and vireos,
e.) are well known to the agriculturists of the United States. The
s-family, of which the common butcher bird, *Collyrio borealis*,
familiar to all, although destroying great numbers of field mice, are
eficial as some of the other birds, from the fact that at least two-
ıeir food consists of beneficial small birds, which they capture on the
e manner of the hawks. The vireos constitute the most valuable
this family. These birds subsists entirely upon insects, which they
th while on the wing, like the true fly-catcher, in the foliage, like
rs, and on the bark, in the larvæ state, like the creepers, titmice,
r generally prefer the solitudes of the forests, but some of the species
homes in the orchards, where they build their pensile nests in the
s of the trees, and rear their young as familiarly and confidingly as
ur most common birds. They should be protected by the farmer.
at system of warfare which is so apparently existing between the
nsects, the vireos come next in importance to the warblers and fly-
s which they seem to constitute a grand auxiliary force.
ımily *Liotrichidæ* are placed our mocking birds *(Mimus)* and wrens,
tes.) It is hardly necessary here to recommend these birds to the
they are already known and appreciated; but there is one species
king birds that, in consequence of the antipathy with which it is
y nearly all classes, no opportunity is lost to procure its destruction.
the cat bird, *Mimus carolinensis*, (Gray.) The school-boy always
point to destroy its nest and eggs; the embryo gunner practises on
an object a little better than a stationary mark; and the farmers'
carte blanche to shoot it at all seasons, because it takes in cherry
r of these luscious fruits for dessert to its insect meal. Does the
w that this bird is one of his best friends?—that its whole life is
is service, constantly employed in destroying his greatest enemies,
? Does he know that it will eat in forty-eight hours its own weight
ms and other injurious larvæ? If so, is not the almost wholesale
. with which it is followed almost everywhere not only injudicious
? I leave these facts to his consideration, and am certain, when

an impartial judgment is given, that he will do away with this absurd prejudice, and protect, as he always should have done, the cat bird.

The *Certhiadæ* (creepers,) and *Paridæ*, (titmice,) are both of importance to agriculture, their food consisting principally of the larvæ of insects which they find in the bark of the trunk and limbs of trees. The chick-a-dee or black-capped titmouse, so well known throughout the country, represents the *Paridæ*, and its habits in capturing its insect prey are so well known that I will not make further mention of them here.

Briefly noticing the *Alaudidæ*, (larks,) which destroy multitudes of injurious insects in the grass and on the surface of the ground, chiefly *Orthoptera* (locusts, grasshoppers, &c.,) and the *Fringillidæ* (finches, sparrows, &c.,) which, although subsisting chiefly upon the seeds of various plants, usually the wild grasses, &c., "feed their young entirely upon the larvæ of insects," we come to the important family *Icteridæ*, in which are included our blackbirds, orioles, &c. These birds, notwithstanding the dislike with which some of them are regarded by the farmers, are all eminently beneficial; the orioles, of which our common golden robin or hang bird, *Icterus Baltimore* (Daudin,) is a familiar type, destroys great numbers of caterpillars and other larvæ equally injurious. These they obtain on the limbs and in the foliage of trees in a manner similar to the cuckoos and warblers. The blackbirds are constantly employed in the destruction of insects and their larvæ in the grass lands and meadows which they capture in a similar manner with the thrushes. The following interesting instance given by Buffon, the great naturalist, will go to show the value of these birds:

"The Isle of Bourbon, where the grakle was unknown, was overrun with locusts, which had been accidentally introduced from Madagascar, the eggs having been imported in the soil with which some plants were brought from that island. The governor-general and the intendent deliberated seriously on the means of extirpating these noxious insects, and for this purpose caused several pairs of the Indian grakle to be introduced into the island. This plan promised to succeed; but, unfortunately, some of the colonists seeing the birds eagerly thrust their bills into the earth of the newly-sown fields, imagined they were in quest of grain, and reported that the birds, instead of proving beneficial, would be highly detrimental to the country. On the part of the birds, it was argued that they raked in new-ploughed grounds, not for the sake of the grain, but for the insects, and were therefore beneficial. They were, however, proscribed by the council, and in the space of two hours after the sentence was pronounced against them not a grakle was found on the island. This prompt execution was followed by a speedy repentance. The locusts gained the ascendancy, and the people, who only viewed the present, regretted the loss of the grakle. In a few years afterwards a few pairs were again introduced. Their preservation and breeding were made a state affair; the laws held out protection to them, and the physicians, on their part, declared their flesh to be unwholesome. The grakles accordingly multiplied, and the locusts were destroyed."

The *Corvidæ*, in which family are placed our crows and jays, are also valuable assistants to the farmer, notwithstanding the former pull up a few hills of corn, (which may be readily prevented by stretching strings about the field,) and the jays destroy the eggs and young of small birds. The insects they destroy more than counterbalance the evil effects of these depredations. The field mice that a pair of crows kill and feed to their young are beyond computation, and it is a gratifying fact that the farmers are at last becoming aware of the value of the crows on the farm, and many already extend them their protection.

RASORES (SCRATCHERS.)

In this order are included the grouse, quails, turkeys, and, by modern naturalists, the doves. These last birds are placed in this order, however, more from their peculiarities of form, than because of their habit of searching food by scratching beneath the surface of the ground. The distinguishing characteristics of the rasores, are, according to Professor Baird, "hind

ıed above the level of the rest." Nostrils arched over by an incumbent ck, fleshy valve. Bill not longer than the head, obtuse anteriorly. Nails ›ad, obtusely rounded." This order has been divided into several families, ıich are more interesting to the naturalists than to the farmer. As they ve but little importance agriculturally speaking, and as my subject has been :eady too extended, I shall dismiss them with but a few general remarks.

The *Columbæ* (pigeons) are injurious in some districts, eminently so by their vages in the grain fields. Some species are gregarious, and their immense ›cks sweep through the rich fields of wheat with a destructiveness hardly edible; they have no redeeming traits, economically speaking, as they destroy ıt very few insects, and the best use to which they can be put is to furnish od to some of their former victims.

The other indigenous rasores are of no importance on the farm with the ex›ption of the quails or partridges (*Perdicidæ.*) These birds, although a great ›rtion of their food consists of the various seeds, destroy immense numbers of sects, chiefly *Orthoptera.* I think that I am safe in saying that three-fourths their food from May until October, consists of these insects and others, both the larvæ and perfect forms. The following extract will serve to illustrate ıis fact:

"A farmer's boy in Ohio, observing a small flock of quails in his father's cornfield, re›lved to watch their motions. They pursued a very regular course in their foraging, com›encing on one side of the field, taking about five rows, and following them uniformly to e opposite end, returning in the same manner over the next five rows. They continued in ıis course until they had explored the greater portion of the field. The lad, suspicious that ›ey were pulling up the corn, fired into the flock, killing one of them, and then proceeded › examine the ground. In the whole space over which they had travelled he found but one alk of corn disturbed. This was nearly scratched out of the ground, but the kernel still lhered to it. In the craw of the quail he found one cut-worm, twenty one striped vine ugs, and one hundred chinch-bugs, but not a single kernel of corn."

This is but one instance of many on record, in which birds and animals itherto deemed injurious, were found on examination to be not only harmless ıt positively beneficial.

GRALLATORES (WADERS.)

The birds of this order are of no great importance to agriculture; some of em are beneficial and others to a certain extent injurious. The characteris›s of these birds are their lengthened neck and legs adapted to wading in the ıter, in or near which they procure their food. They are divided by modern ıturalists into the two great sub-orders.

"HEREDIONES.—Face or lores more or less naked, or else covered with feathers different ›m those on the rest of the body, except in some *Gruidæ.* Bill nearly as thick at the base the skull; hind toe generally nearly on the same level with the anterior; young reared in sts, and requiring to be fed by the parents. And *Grallæ*, lores with feathers similar to ose on the rest of the body. Bill contracted at base, where it is usually smaller than the ull; hind toe generally elevated; young running about at birth, and able to feed themlves."

In the first of these sub-orders are included our cranes, herons, bitterns, ıises, &c. These birds, although subsisting partly upon insects, are generally ıjurious, by destroying the smaller beneficial reptiles, (such as the toads, frogs, nd small snakes,) which with small fishes constitute the principal portion of heir food. They are not sufficiently numerous however in most districts to be onsidered pests, and further observation may discover facts that will entitle hem to the forbearance, at least, of the farmer.

In the *Grallæ* are placed the plovers, woodcocks, snipes, sandpipers, rails, or adow-hens, &c. Of these, the rails are the only directly beneficial birds, as ›y subsist almost entirely upon *Orthopterous* and other injurious insects. others feed upon worms (the woodcocks and snipes) and small shellfish

and often insects, as the plovers, sandpipers, &c. The spotted sandpiper or peet-weet, *Tringoides macularius* (Gray,) is often seen in the ploughed fields and even in the cornfields eagerly searching for insects.

In a brief general survey of the habits and characteristics of the different birds and animals, and a similar review of the facts which have been presented by scientific men regarding them, we find two great classes, one beneficial and the other injurious. Of the mammals we found injurious mice and other *rodents* which were being constantly destroyed by the different *carnivora*. We also found the bats feeding entirely upon insects which they capture in the air; on the surface of the ground the shrews are busy at the same work, as are also the moles beneath the surface. In the birds we found different tribes with as distinctly marked features. The diurnal birds of prey we found to be generally injurious, because of their destroying small beneficial birds; and the nocturnal birds of prey we found to be beneficial in subsisting almost entirely upon injurious mammals. We also found other whole orders whose lives are spent in destroying insects. The manner in which this destruction is effected we found to be varied and evidently intended by the Creator to be effectual; for we found those birds disposed in different circles or spheres, in each of which are placed those best adapted both by form and habits—for instance, the blackbirds, thrushes, larks, starlings, &c., destroy the insects infesting the grass crops and other vegetations near the ground; the creepers, titmice, &c., destroy the insects, both in the larvæ and perfect states, which are found on the limbs and bark of trees; the woodpeckers destroy the borers in the wood of trees; the warblers, cuckoos, and orioles capture the insects and caterpillars in the foliage; the fly-catchers are almost continually busy through the day, and the night-hawks and whip-poor-wills in the night, capturing the flying insects near the earth; and the swallows, that the insects shall have no loop-hole for escape, are on the wing from daylight until dark, and even later, securing those that have escaped through all their enemies.

With these wise provisions for the very existence of man, and with these beautiful laws for his protection, how ungrateful is he in disregarding them, as he too often does even to the extent of actual interference and wilful neglect in their execution. Farmers, henceforth let there be an honest and kindly appreciation of the animals that have been created for our services. Love and respect them. And the birds, think them not of too little importance to receive your notice, for it is written: "Are not two sparrows sold for a farthing, and one of them shall not fall on the ground without your Father?"

Encourage them, protect them, drive them not from you. Observe them, study their habits, notice how their whole lives are given for your benefit; and although sometimes they may seem to be doing you an injury, be lenient and patient with them, for "nothing was made in vain," and they certainly at some time or another, will repay you more than tenfold all that they may have taken from you.

AGRICULTURAL ORNITHOLOGY.

BY E. MICHENER, M. D., AVONDALE, PENN'A.

wing paper was originally intended to embrace a list of all the birds known to have been found unty, Pennsylvania; but finding that would be too voluminous for the space allotted, I have water birds, as they do not specially affect the interests of agriculture by their manner of feed.
E. M.]

INSECTIVOROUS BIRDS OF CHESTER COUNTY, PENNSYLVANIA.

ıe construction of the universe the Divine Architect, whose creative ns and consummate arrangements display the perfection of wisdom, a harmonious whole, amply provided with well-regulated checks and

So long as these adjusting powers were not disturbed by extraneous terposed by human agency, an inordinate increase of noxious insects ained by the physical operation of the elements, and by the instincts ral propensities of certain insectivorous animals. Among the latter numerated many of the smaller quadrupeds,[1] reptiles,[2] insectivorous d the parasitic and predacious insects.[3,4]

harmony of creation has been interrupted by the wanton destruction of reptiles, and by the intervention of other causes; and in consequence erangement in the economy of nature, the insect vegetable feeders ome more abundant, and consequently more destructive."—*Dr. Brinkle.*

t be plain to all observers that most of our common birds are partly, y of them almost wholly, insectivorous—that is, insect-eaters. We or a single hour, watch their movements, their industry and dexterity ing insects, without being impressed with the vast numbers which they ry day devour. It is no less certain that the number of birds is being y and rapidly diminished from year to year. We need not, therefore, rised that, in proportion as the number of birds has been diminished, ts have increased in a corresponding ratio. Reason should have taught would be so, and experience has verified the fact; and we can hardly ribing the increase of the one to the decrease of the other. Hence it an important inquiry, What are the causes which have so greatly re- number of our birds? In pursuing this inquiry it will be convenient them into forest birds and field birds.

rest birds appear rather to shun the company of man, and to recede as the vilization advance. This may be owing in part to the destruction of s, which afforded them both food and shelter, and in part to the wan- uction of them with their eggs and nests. It is some consolation, how- effect that forest birds feed mostly on forest insects, and therefore do nmediately affect the interests of the agriculturists as those which the fields.

eld birds, on the contrary, seem to court domestication, and to seek ction of man by their familiar approach to his dwelling. They incline pany the settlements, and delight to dwell in the field, the orchard, or n. Living, as they do, in the very midst of those scenes of insect on of which we so often complain, and feeding, as most of them do, uthors of that devastation, we must be blind, indeed, not to perceive h we owe to them as a direct check upon the increase of noxious insects.

1. Rats, mice, shrews, moles.
2. Snakes, frogs, toads, lizards.
3. Woodpeckers, swallows, crows.
4. Ichneumons, dragon flies.

It is not the more familiar species only which instinctively seek man's protection. Even the shy and retiring forest birds will sometimes do so in seasons of extreme peril. I have seen the timid and wary pheasant, *(Bonassa umbellus,)* when pursued by a hawk, alight on the ground within six feet of my door, where I was standing, and quietly remain until the danger had passed by, apparently well assured that the enemy would not molest it while there, and rightly judging that I would not betray the confidence reposed in me by doing it an injury.

It would, indeed, seem irreverent to Him who gave them for us to doubt or to disbelieve that the instincts referred to were intended by their Divine Author to establish and maintain a reciprocal interest between the birds which possess them and ourselves, and to promote the welfare of both. "Both are as the Lord hath made them; organized and controlled by laws as wise as himself; universal as his presence; and potent as his power. He who assails these laws assails Deity himself."

Now, if it be so that the birds were designed to maintain the balance of insect life, and prevent their inordinate increase, how unwise in us to break the balancing power by their wanton destruction! But the birds have been cruelly and most unwisely persecuted. The balance has been broken, and an increase of destructive insects from year to year has been the consequence. The question then arises, how shall we restore the balance which has been lost? The simple answer is, as in every other case of wrongdoing, "cease to do evil; learn to do well." Cease to violate the laws of nature, and of nature's God, by the destruction of these his creatures, and by every available means afford them protection, and promote their comfort and consequent multiplication.

But to whom shall the plea for their protection be addressed? It is not the cultivator of the soil alone who sustains loss from the depredations of insects upon his crops. When these fail the supply is diminished, and the market value enhanced. Hence the consumer suffers along with the producer. The appeal, therefore, comes home to every one who subsists on the productions of the soil. It affects the pecuniary interests and the life comforts, not only of him who holds the plough, but of the merchant at his desk, and the cobbler in his stall. It is made, not to a class, but to the whole community. Nevertheless, the owners and occupiers of the soil—the agricultural class—hold a position which seems, necessarily, to constitute them the special guardians of the feathered race. To them, therefore, I particularly address this special plea.

Appeals for the birds have often been made, and have as often passed unheeded. Their constantly diminished numbers still suffer unmerited persecution, and the complaints of noxious insects grow louder and stronger from year to year. Why is it so? Are men so wilfully blind to their own interests? Or has the evidence furnished been insufficient to convince their understandings that the birds are really their friends and benefactors? This seems the most rational conclusion. Farmers, as a class, cannot be called scientific, but they are intelligent, reflecting, practical men, accustomed to look after their own interests; and if convinced that those interests lie in the protection of the birds, I have a better opinion of them than to suppose that they would not adopt a practice correspondent therewith.

Under this feeling of confidence in the good sense of the farming community, I have undertaken the preparation of this plea on behalf of the birds. Peradventure a brief detail of facts may satisfy the reason, while mere inferences drawn from them would fail to do so.

Let every farmer and occupier of the soil cease from the needless destruction of birds, their eggs and nests, and consider himself as their Heaven-appointed guardian. Let every one be careful, according to his opportunity and means, to provide for their wants by putting up suitable boxes for martins, bluebirds, wrens, &c., and by planting shrubbery and trees, especially evergreens, to af-

ford them shelter from their enemies, and a place to build and rear their young. Let every child be taught to admire the beauty, and to know the value, of birds, and the sanctity of their nests, and be made to feel the penalty for disobedience. Let every vagrant sportsman and truant schoolboy know and feel the rigid restraints of the law* whenever they trespass upon the premises with dog or gun after having been duly notified.

The following extract taken from the *Ohio Farmer* several years ago is worth preserving in this connexion:

"On no pretext whatever should farmers and gardeners permit their birds to be disturbed. Instead of killing them, or frightening them away, they should make use of every means in their power to induce them to increase in numbers, and become more tame and familiar. The worst of them earn twenty times what they eat; and then what exquisite pleasure to have your garden, yard, orchard, or wood alive and vocal with the music of merry birds! Plant trees for them; if necessary, build houses for them; and let no cat, dog, or boy ever molest them, and they will teach you lessons of domestic bliss, preach you sermons, and warble you such hymns as you never heard elsewhere. Be kind to the birds."

In the preparation of this paper my primary object has been to furnish a brief economical history of the ordinary food and feeding habits of the different species of birds. I have also endeavored to make it an exponent of the ornithological fauna of the district which it represents, thus interposing a connecting link between economical and scientific ornithology. It may be objected that the district is too limited to afford satisfactory results. The objection is more specious than real. Many of the Chester county birds are found throughout large portions of the United States, while others are replaced by kindred species possessing similar habits. To extend the basis, therefore, would greatly increase the labor and cost, without adding much to the value of the work.

THE PLAN.

A system of classification has been adopted with the names of the families, genera, and species, with their authors. Immediately after will be found the common or familiar names.

It is convenient to designate the species as—

1. *Constant residents.*—Some portion, at least, of which remain with us throughout the year.

2. *Summer residents.*—Greater or less numbers of which spend the summer with us and breed.

3. *Winter residents.*—Mostly northern species, which spend the severe part of the year with us.

4. *Migratory.*—Those birds which pass and repass in spring and autumn.

5. *Wandering.*—Birds which migrate irregularly, wherever their food may be most abundant.

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* Many States have made laws for the protection of birds. An act of the legislature of Pennsylvania, of April 21, 1858, provides:

"SEC. 1. It shall not be lawful for any person within this commonwealth to shoot, kill, or in any way trap or destroy any bluebird, swallow, martin, or any other *insectivorous* bird, at *any season* of the year, under the penalty of two dollars."

"SEC. 4. That no person shall at any time wilfully destroy the eggs or nests of any birds mentioned in the different sections of this act, within this commonwealth, under a penalty of two dollars for each and every offence."

"SEC. 6. And if the offender shall refuse to pay the said forfeitures, he shall be committed to the proper county jail, for every such offence, for the space of two days, without bail, or any mainprize."

Other birds are also protected, by this and other acts, *as game birds.* Much of this pro- however, is not intended to benefit the agriculturist, but to preserve the game for *gen- runners*, who pursue their sport in violation of the rights of the landholder, and to the injury of his property, other than by killing the birds.

The reader will no doubt find many seeming exceptions to these divisions; for instance, the turkey vulture mostly migrates further south in winter, yet I have seen it in midwinter, when the mercury was below zero, striving with a crow for the possession of a dead mouse.

Birds are also either—

1. *Carnivorous:* flesh-eaters—vultures, hawks, &c.
2. *Piscivorous:* fish-eaters—kingfishers, herons, &c.
3. *Insectivorous:* insect-eaters—woodpeckers, flycatchers, &c.
4. *Granivorous:* grain-eaters—pigeons, sparrows, &c.
5. *Omnivorous:* all-eaters—crows, blackbirds, &c.

These terms are even more exceptional than the preceding ones. In a variable climate, or where the species migrates from warm summer to cold winter regions, or the contrary, its food must often vary with the season, &c. Hence, both as regards residence and food, the terms are only the expression of a general fact, and having only a relative application

LAND BIRDS.

I. FAMILY VULTURIDÆ, (THE VULTURES.)

1. Genus *Cathartes*, (Illiger, 1811.)

1. *C. aura*, (Linn., 1766, Illiger, 1811,) turkey vulture. Resident, common in summer; rare in winter; carnivorous; with us its chief food is carrion; "feeds on all sorts of food, and sucks the eggs, and devours the young of other birds." The turkey buzzard, rendered so repulsive by its habits, is nevertheless a most useful scavenger for the speedy removal of every form of putrescent animal matter, so offensive to our olfactories, so prejudicial to our health. It well deserves the protection with us that both it and its cousin the black vulture receive in southern climates where they are almost domesticated.

II. FAMILY FALCONIDÆ, (THE HAWKS.)

2. Genus *Falco*, (Linn., 1766.)

1. *F. anatum*, (Bon., 1838,) duck hawk. Winter resident, very rare; carnivorous; feeds on ducks, pigeons, blackbirds, &c.

2. *F. columbarius*, (Linn., 1766,) pigeon hawk. Wandering, very rare; carnivorous; feeds on pigeons and smaller birds, field mice, &c.

3. *F. sparverius*, (Linn., 1766,) sparrow hawk. Resident, common; less so in winter; carnivorous. As its name implies, it feeds on sparrows and other small birds, field mice, shrews, and small reptiles.

3. Genus *Astur*, (Lacepede, 1803.)

1. *A. atricapillus*, (Wils.,) Bd., goshawk. Winter resident, not common; carnivorous; preys on partridges, birds, field mice, &c.

4. Genus *Accipiter*, (Briss., 1760.)

1. *A. cooperii*, (Bon.,) Bd., Cooper's hawk. Winter resident, rare; carnivorous. Its principal food consists of birds and small quadrupeds; when hungry, will not refuse a chicken for its dessert.

2. *A. fuscus*, (Gmel.,) Bd., sharp-shinned hawk. Resident, or nearly so; never abundant; carnivorous; feeds on small birds, mice, &c.

Observation.—The smaller members of this family mostly resort to the woods, fields, and meadows in quest of food, and seldom visit the poultry yard, unless pressed by hunger. The farmer can well afford them this small pittance for their service in destroying mice, shrews, moles, &c., in his fields.

5. Genus *Buteo*, (Cuv., 1817.)

1. *B. borealis*, (Gmel.,) Bd., red-tailed hawk. Resident, common; carnivorous. The predatory habits of this powerful bird have rendered him the terror of the poultry yard. Partridges, larks, and other birds, rabbits, squirrels, mice,

even reptiles, form his less dainty fare. I must leave the farmer to balance account as he best can.

2. *B. lineatus*, (Gmel.,) Jardine, red-shouldered hawk. Winter resident, frent in season; carnivorous; habits somewhat similar to the preceding species, h which it is often confounded; but is much less troublesome to the farmer.

3. *B. pennsylvanicus*, (Wils.,) Bd., broad-winged hawk. Resident, and quite e; carnivorous; feeds on birds, mice, reptiles; rarely on chickens.

5. Genus *Archibuteo*, (Brehm, 1828.)

1. *Lagopus*, (Gmel.,) Bd., rough-legged hawk. Winter resident, not comon here; carnivorous; affects meadows and the marshy borders of streams, here it feeds on such birds, mice, and reptiles as are found in those places. The number of meadow mice which this species destroys, ought, one would ink, to insure it the protection of every husbandman." (Aud.)

2. *A. sancti johannis*, (Gmel.,) Bd., black hawk. Winter resident, rare; carvorous; habits similar to those of the last-named species

Observation.—Audubon considers this the same as the rough-legged hawk more mature plumage.

7. Genus *Circus*, (Lacep., 1808.)

1. *C. hudsonius*, (Linn.,) Bd., marsh hawk. Wandering, mostly seen in winer; carnivorous; affects meadows and marshy grounds, hence its name; feeds n small birds, but more especially on mice and other small quadrupeds, and, hen in season, on frogs, snakes, &c.

8. Genus *Aquila*.

1. *A. canadensis*, (Linn.,) Bd., golden eagle. Wandering, very seldom seen ere; carnivorous. With courage equal to his strength, he fearlessly pounces on swan or a goose, a kid or a lamb, and, when instigated by extreme hunger, as been known to seize on little children and bear them off to his mountain yry. "Young fawns, raccoons, hares, wild turkeys, and other large birds, onstitute a portion of his bill of fare." (Aud.)

9. Genus *Haliætus*, (Savig., 1809.)

1. *H. leucocephalus*, (Linn.,) Bd., white-headed eagle. Wandering, not comon; piscivorous. The principal food of the bald eagle is fish, and this is ostly plundered from the fish hawk; sometimes preys on ducks and other ater birds; when these fail, he will even feed on carrion, and, like his older rother, attacks lambs, fawns, pigs, &c. Instances are related of his seizing mall children and carrying them away to his nest.

10. Genus *Pandion*, (Savig., 1809.)

1. *P. carolinensis*, (Gmel.,) Bd., fish hawk. Wandering, frequent along the arger streams; piscivorous; affects our rivers and bays, and passes from one o another as the occurrence of ice, &c., may require. Feeds almost wholly on ish, which it catches with wonderful dexterity; too often, as has been noticed, o be robbed of its prize by the white-headed eagle.

III. FAMILY STRIGIDÆ. (THE OWLS.)

11. Genus *Strix*, (Linn., 1766.)

1. *S. pratincola*, (Bon.,) barn owl. Winter resident, rare; carnivorous. I am satisfied that our bird feeds entirely on the smaller species of quadrueds." (Aud.) This, of course, refers to mice and other nocturnal animals.

12. Genus *Bubo*, (Cuv., 1817.)

1. *B. virginianus*, (Gmel.,) Bd., great horned owl. Resident, frequent; a rorous. "Its food consists of half-grown turkeys, pheasants, and domestic ultry of every kind; also hares, young opossums, and squirrels." (Aud.) his is our most noteworthy robber of the hen-roost.

13. Genus *Scops*, (Savig., 1809.)

1. *S. asio*, (Linn.,) Bd., red screech-owl. Resident, common; carnivorous; s on mice, small sparrows, &c., and very often catches nocturnal beetles

and other insects. It thus destroys a large number of field mice, and the large cockchafer, so injurious to our fruit trees. In winter it familiarly enters our barns and outhouses, where it becomes an expert and industrious mouser.

2. *S. nævia*, (Gmel.,) Michener, mottled owl. Resident, common; carnivorous; habits similar to the last.

Observation.—Most ornithologists consider the red and gray screech-owls identical. This may be so. Bonaparte, Audubon, and others say the *red* is the young and the *mottled* the mature bird; others just reverse it. Audubon says the "feathers change their colors as the pairing season advances, and in the *first spring* the bird is in its perfect dress;" consequently the young or red bird could not be expected to breed; yet I have found red parents with a red brood, and also mottled parents with a mottled brood. Although presenting an anomaly perhaps unknown in any other species of bird, I have therefore reseparated them for the present.

14. Genus *Otus*, (Cuv., 1817.)

1. *O. wilsonianvs*, (Gmel.,) Less., long-eared owl. Resident, rare, or seldom seen; carnivorous. "It preys chiefly on quadrupeds of the genus *arvicola*, (meadow mice,) and in summer destroys many beetles." (Aud.)

15. Genus *Brachyotus*, (Gould, 1837.)

1. *B. cassinii*, (Forst.,) Brewer, short-eared owl. Resident, frequent in winter, rare in summer; carnivorous; habits and food similar to those of the preceding species, which it somewhat resembles, except that it is more diurnal, and consequently feeds more on day food. When hungry, it will approach the farm-house in quest of garbage ejected from the kitchen.

16. Genus *Syrnium*, (Savig., 1809.)

1. *S. nebulosum*, (Forst.,) Bd., barred owl. Resident, frequent—most so in winter; carnivorous. "A great destroyer of poultry, particularly of chickens when half grown; it also secures mice, rabbits, and small birds," and, like other gourmands, "is especially fond of a kind of frog common in the woods of Louisiana." (Aud.)

17. Genus *Nyctale*, (Steph., 1826.)

1. *N. acadica*, (Gmel.,) Bd., little owl. Resident, not common, or rarely seen; carnivorous; "feeds on mice, beetles, moths, and grasshoppers," (Nutt.,) "small quadrupeds and birds." (Aud.)

18. *Nyctea*, (Steph., 1826.)

1. *N. nivea.*, (Bona.,) Bd., snowy owl. Winter resident, very rare; carnivorous; rather diurnal or crepuscular than nocturnal. "Its usual food while it remains with us consists of hares, squirrels, rats, and fishes." (Aud.) It also catches the pheasant and other kindred birds.

IV. FAMILY CUCULIDÆ, (THE CUCKOOS.)

19. Genus *Coccygus*, (Vieill., 1816.)

1. *C. americanus*, (Linn.,) Bon., yellow-billed cuckoo. Summer resident, common; insectivorous. They seem to prefer insect food, but suck the eggs of other birds, and also feed on berries, &c. It should, however, serve as a special plea on their behalf, that they not only devour but even feed their young on the hairy caterpillars of our orchards, which are rejected by most other insectivorous birds.

2. *C. erythrophthalmus*, (Wils.,) Bon., black-billed cuckoo. Summer resident, frequent; insectivorous. This and the preceding species very closely resemble each other, both in appearance and habits.

V. FAMILY PICIDÆ, (THE WOODPECKERS.)

20. Genus *Picus*, (Linn., 1748.)

1. *P. villosus*, (Linn.,) hairy woodpecker. Resident, common; insectivorous; feeds on the larvæ of insects, and on the insects themselves; although in autumn it seeks berries, &c.

2. *P. pubescens*, (Linn.,) downy woodpecker. Resident, common; insectivorous; habits and food similar.

3. *P. borealis*, (Vieill.,) red-cockaded woodpecker. Accidental; very rare; insectivorous; habits similar. These are highly useful birds in destroying worms and insects which lodge under dead bark and in rotten wood.

Observation.—Some of these birds have a singular habit, the purpose of which is not well understood, "of puncturing the smooth, thin bark of orchard trees in regular circles, so near to each other that eight or ten of them may be covered by a dollar." (Nutt., after Wils.) This has obtained for them the common name of "sap-suckers." They even puncture resinous trees in the same manner. I have not observed the trees to be injured by them.

21. Genus *Sphyropicus*, (Bd., 1857.)

1. *S. varius*, (Linn.,) Bd., yellow-bellied woodpecker. Resident, rarely seen during summer; insectivorous; secluded in the forest. Its "food consists of wood-worms and beetles, to which it adds small grapes and berries."

22. Genus *Hylotomus*, (Bd., 1858.)

1. *H. Pileatus*, (Linn.,) Bd., pileated woodpecker. Resident, almost extinct with us; insectivorous. This shy bird feeds, like its congeners, on the beetles, and their larvæ, which always abound among dead and decaying timber. If these fail, he resorts to acorns, nuts, and berries.

23. Genus *Centurus*, (Sw., 1837.)

1. *C. carolinus*, (Linn.,) Bd., red-bellied woodpecker. Resident, frequent; rare in summer; insectivorous; feeds on various kinds of insects and larvæ, and on berries, &c., in the manner of its yellow-bellied cousin.

24. Genus *Melanerpes*, (Sw., 1831.)

1. *M. erythrocephalus*, (Linn.,) Bd., red-headed woodpecker. Resident, very common; insectivorous. This elegant and familiar species is extremely expert in finding and catching the insects which conceal themselves beneath the bark of trees. He also eats juicy fruits and berries, as well as the ripening corn. The farmer often thinks that he takes more in cherries and garden fruits than his services are worth.

25. Genus *Colaptes*, (Sw., 1827.)

1. *C. auratus*, (Linn.,) Sw., golden-winged woodpecker. Resident, common—rare in winter; insectivorous; feeds on insects, wood-lice, ants, &c., with cherries, various berries, and even corn. "The farmer, forgetting his past services, and only remembering his present faults, closes his career with the gun, and unthinkingly does to himself and the public an essential injury." (Nutt.)

VI. FAMILY TROCHILIDÆ, (THE HUMMING BIRDS.)

26. Genus *Trochilus*, (Linn., 1748.)

1. *T. colubris*, (Linn., 1766,) ruby-throated humming bird. Summer resident, common; insectivorous. This beautiful little bird has so long been considered *mellivorous* (honey-eater) that the reader will hardly admit its claim to be insectivorous; "but it is essentially an *insect hunter*, and not a *honey-sucker*. Its long, delicate bill enters the cup of the flower, and the protruded, double-tubed tongue, delicately sensible, and imbued with a glutinous saliva, touches each insect in succession, and draws it from its lurking place to be instantly swallowed." "Their food consists principally of insects, generally of the coleopterous order, with some equally diminutive flies." (Aud.)

VII. FAMILY CYPSELIDÆ, (THE SWIFTS.)

27. Genus *Chætura*, (Steph., 1825.)

1. *C. pelasgia*, (Linn.,) Steph., chimney swift. Summer resident, abundant; insectivorous. If the reader will reflect on the myriads of insects which fill the air on the approach of eventide, and watch these birds, as they wing their rapid

flight in ceaseless circles, gathering their evening repast, he will not grudgingly endure the little annoyance which they may occasion in his chimney.

Observation.—The chimney swallows incline to be gregarious, especially in their roosting places. Audubon tells of a hollow tree in which he estimated that over nine thousand had collected, and were in the habit of collecting nightly to roost. An old chimney in a neighboring county was found, on one occasion, to contain a still larger number; and a very few years since there were some four thousand of them taken from a chimney (which had been unused) of one of my neighbors.

VIII. FAMILY CAPRIMULGIDÆ, (THE GOAT-SUCKERS.)

28. Genus *anthrostomus*, (Gould, 1838.)

1. *A. vociferus*, (Wils.,) Bon., whip-poor-will. Summer resident, common; insectivorous; habits nocturnal; feeds on moths and other night-flying insects.

29. Genus *Chordeiles*, (Sw., 1831.)

1. *C. popetue*, (Vieill.,) Bd., night hawk. Summer resident, very common; insectivorous; habits much like the preceding, but more crepuscular or diurnal; often seen out in cloudy weather. "Its food consists entirely of insects, especially coleoptera; it also seizes on moths and caterpillars, and is very expert at catching crickets and grasshoppers, with which it sometimes gorges itself." (Aud.)

IX. FAMILY ALCEDINIDÆ, (THE KINGFISHERS.)

30. Genus *Ceryle*, (Boie, 1828.)

1. *C. alcyon*, (Linn.,) Boie, 1828, belted kingfisher. Resident, frequent along streams; piscivorous; feeds on fish and a few water insects.

X. FAMILY COLOPLERIDÆ, (THE FLY-CATCHERS.)

31. Genus *Tyrannus*, (Cuv., 1800.)

1. *T. carolinensis*, (Gmel.,) Vieill., kingbird fly-catcher. Summer resident, common; insectivorous. "Beetles, grasshoppers, crickets, and winged insects of all descriptions form his principal summer food; in autumn berries constitute a favorite repast." (Nutt.) Reader, see him perched on an old mullen stalk, watching all around, and capturing every insect that comes in his sight, and say whether he does not pay for the few bees he may destroy.

32. Genus *Myiarchus*, (Cab., 1844.)

1. *M. crinitus*, (Linn.,) Cab., 1855, great-crested fly-catcher. Summer resident, frequent; insectivorous; dwells mostly in forests and feeds on such insects as are found there.

33. Genus *Sayornis*, (Bon., 1854.)

1. *S. fuscus*, (Gmel.,) Bd., peewee fly-catcher. Summer resident, common; insectivorous. This familiar and industrious destroyer of insects needs no introduction, and is capable of telling its own story.

34. Genus *Contopus*, (Cab., 1855.)

1. *C. borealis*, (Sw.,) Bd., olive-sided fly-catcher. Summer resident, not frequent; insectivorous; feeds on others of the genus.

2. *C. virens*, (Linn.,) Cab., wood peewee fly-catcher. Summer resident, common; insectivorous. These two species are very similar and among the most active and industrious fly-catchers.

35. Genus *Empidonax*, (Cab., 1855.)

1. *E. trailii*, (Sw.,) Bd., Trail's fly-catcher. Summer resident, frequent; insectivorous.

2. *E. minimus*, (Bd.,) least fly-catcher. Summer resident, frequent; insectivorous.

3. *E. acadicus*, (Gmel.,) Bd., small green-crested fly-catcher. Summer resident, common; insectivorous

4. *E. flaviventris*, (Bd.,) yellow-bellied fly-catcher. Summer resident, frequent; insectivorous. All the species of this genus—indeed all the family—possess similar habits. We can hardly walk out on a summer day without seeing some of them perched on a fence stake or dead bough intently watching for their prey, and woe betide the insect, whether beetle, moth, or fly, which may dare to show itself either on the ground or wing. The feat accomplished, they return to the same perch to await the appearance of other prey Surely no observer can be so obtuse as not to appreciate the service thus rendered.

XI. FAMILY TURDINÆ, (THE THRUSHES.)

36. Genus *Turdus*, (Linn., 1735.)

1. *T. mustelinus*, (Gmel., 1738,) wood thrush. Summer resident, common; omnivorous. "Beetles, caterpillars, various insects, and, in autumn, berries, constitute its principal food."

2. *T. pallasi*, (Cab.,) hermit thrush. Summer resident, frequent; omnivorous; feeds on various insects and small berries.

3. *T fuscescens*, (Wils.,) Steph., Wilson's thrush. Summer resident, frequent; omnivorous. Like the preceding, its food is principally coleopterous insects and autumnal berries.

4. *T. swainsonii*, (Wils.,) Cab., olive-backed thrush. Summer resident, frequent; omnivorous; food and habits similar.

5. *T. aliciæ*, (Bd.,) gray-cheeked thrush. Summer resident, very rare; doubtful; omnivorous; unknown, except from analogy.

6. *T. migratorius*, (Linn.,) robin. Resident, frequent; rare in winter; omnivorous. In early summer they feed much on the ground, picking up the various worms and insects of the season. In autumn they often resort to small fruits and berries. When winter arrives many of them retire to the tide marshes of our rivers, where seed and insect food are still found. When these have been long covered with snow, the robins have returned to our orchards and found subsistence in the rotten apples still hanging on the trees. This was the case in the winters of 1831 and 1836.

37. Genus *Sialia*, (Sw., 1837.)

1. *S. sialis*, (Linn.,) Bd., bluebird. Resident, very common; rare in winter; insectivorous. This favorite of every household, the lovely and confiding bluebird, seeks its food on the ground among grass. It seems to prefer coleopterous beetles, but also devours other insects, caterpillars, spiders, &c., and sometimes ripe berries. It well repays the use of the box, so often provided for its habitation.

38. Genus *Regulus*, (Cuv., 1799.)

1. *R. calendula*, (Linn.,) Licht., ruby-crowned wren. Migratory, frequent in season; insectivorous.

2. *R. satrapa*, (Licht.,) golden-crested wren. Migratory, frequent in season; insectivorous. These species, very nearly identified by appearance and habits, are wholly insect-feeders. Ever vigilant, they may be seen closely scanning the bark and leaves of trees and shrubs, in the orchard or garden, in quest of small insects or larvæ, spiders, &c. Sometimes they pursue and capture them on the wing. Their scrutinizing habits have obtained for them the name of wrens.

XII. FAMILY SYLVICOLIDÆ, (THE WOOD WARBLERS.)

39. Genus *Anthus*, (Bechts., 1802.)

1. *A. ludovicianus*, (Gmel.,) Licht., titlark. Winter resident, frequent; gregarious; insectivorous; mostly affects ploughed and bare fields on the margin of waters where it seeks various insects, seeds, &c.

40. Genus *Mniotilta*, (Vieill., 1816.)

1. *M. varia*, (Linn.,) Vieill., black and white creeper. Migratory, frequent; insectivorous. "It lives principally on small ants and their larvæ," which it mostly gleans from the rough bark of orchard and forest trees.

41. Genus *Parula*, (Bon., 1838.)

1. *P. americana*, (Linn.,) Bon., blue yellow-backed warbler. Migratory, frequent; insectivorous; somewhat of a creeper; very active and useful in destroying small insects during the opening bloom of spring.

42. Genus *Protonotaria*, (Bd., 1858.)

1. *P. citrea*, (Bodd.,) Bd., prothonotary warbler. Summer resident, extremely rare; insectivorous; feeds on small insects, worms, caterpillars, &c.

43. Genus *Geothlypis*, (Cab., 1847.)

1. *G. trichas*, (Linn.,) Cab., Maryland yellow throat. Summer resident, frequent; insectivorous. Lives secluded in thickets and coarse tangled grass near streams where it feeds on small insects. "Caterpillars and spiders form its principal food." (Aud.)

2. *G. philadelphia*, (Wils.,) Bd., mourning warbler. Summer resident, extremely rare; insectivorous; habits resemble the former.

44. Genus *Oporornis*, (Bd., 1858.)

1. *O. agilis*, (Wils.,) Bd., Connecticut warbler. Migratory, very rare; insectivorous. Audubon saw them "chasing a species of spider which runs nimbly over the water, and which they caught by gliding over it."

2. *O. tephrocotis*, (Nutt., 1840,) Michener's warbler. Migratory, very rare; insectivorous; affects margins of woods, thickets, and old fences; keeps near the ground when seeking insects.

Observation.—The type of this species was obtained by the writer in the autumn of 1839 in Chester county. It was described and published by Nuttall in the following year. Some have doubted it being a good species, it being too near *O. agilis;* others suppose it to be genuine. I shall retain it for the present Several specimens have been obtained.

3. *O. formosus*, (Wils.,) Bd., Kentucky warbler. Migratory, very rare, north of Maryland; insectivorous. "This species destroys great numbers of spiders." All the species are active insect-hunters, and affect the woods and neighboring fields, orchards, and gardens.

45. Genus *Icteria*, (Vieill., 1790.)

1. *I. viridis*, (Gmel.,) Bon., yellow-breasted chat. Summer resident, frequent; insectivorous; affects thickets, near water, and feeds on shelly-winged beetles, sometimes on berries and seeds.

46. Genus *Helmitherus*, (Raf., 1819.)

1. *H. vermivorus*, (Gmel.,) Bon., worm-eating warbler. Migratory, or very rare in summer; insectivorous. "They are very active and indefatigable insect-hunters." (Nutt.)

47. *Helminthophaga*, (Cab., 1850–'51.)

1. *H. pinus*, (Linn.,) Bd., blue-winged yellow warbler. Summer resident, rare, and very secluded; insectivorous. "They feed on the eggs and larvæ of various insects, as well as flies, caterpillars, ants, and coleoptera." (Nutt.)

2. *H. chrysoptera*, (Linn.,) Cab., golden-winged warbler. Migratory, quite rare; insectivorous. This scarce bird is only seen in spring, when it frequents the tops of forest trees, and collects its food among the leaves and branches.

3. *H. ruficapilla*, (Wils.,) Cab., Nashville warbler. Summer resident, very rare; insectivorous. "Its food consists of insects and larvæ, which it procures by searching actively and diligently among the leaves and buds of low trees." (Aud.)

4. *H. peregrina*, (Wils.,) Cab., Tennessee warbler. Migratory, very rare; insectivorous; "an expert catcher of flies."

48. Genus *Seiurus*, (Sw., 1827.)

1. *S. aurocapillus* (Linn.,) Sw., golden-crowned thrush. Summer resident, common in woods; insectivorous. "Feed wholly on insects and their larvæ, particularly small coleopterous kinds, and ants collected on the ground." (Nutt.)

2. *S. noveboracensis*, (Gmel.,) Nutt., water thrush. Migratory, frequent in marshy thickets; insectivorous. Feeds on such insects and their larvæ as inhabit marshy localities.

3. *S. ludovicianus*, (Aud.,) Bon., large-billed water thrush. Migratory, more rare than the last; insectivorous. Very closely resembles the preceding species in appearance and habits.

49. Genus *Dendroica*, (Gray, 1842.)

1. *D. virens*, (Gmel.,) Bd., black-throated green warbler. Migratory, rather rare; insectivorous. "May be occasionally seen for an hour at a time carefully and actively searching for small caterpillars and winged insects amidst the white blossoms of the shady apple tree." (Nutt.)

2. *D. canadensis*, (Linn.,) Bd., black-throated blue warbler. Migratory, rare; insectivorous. "An expert catcher of flies."

3. *D. coronata*, (Linn.,) Gray, yellow-rumped warbler. Migratory, abundant; insectivorous. "Feeds on insects, &c.; is expert in catching flies, and is a great devourer of caterpillars." (Aud.)

4. *D. blackburniæ*, (Gmel.,) Bd., Blackburnian warbler. Migratory, rather rare; insectivorous. "An exceedingly nimble insect-hunter, keeping towards the tops of trees."

5. *D. castanea*, (Wils.,) Bd., bay-breasted warbler. Migratory, quite rare; insectivorous. "Sometimes seen searching for insects along fences," &c.

6. *D. pennsylvanica*, (Linn.,) Bd., chestnut-sided warbler. Migratory, frequent; insectivorous. "In the spring they are generally restless, and intently engaged in the chase of insects amidst the blossoms and tender leaves."

7. *D. cærulea*, (Wils.,) Bd., blue warbler. Migratory, quite rare; insectivorous. "Feeds principally on insects and their larvæ."

8. *D. striata*, (Forst.,) Bd., black-poll warbler. Migratory, frequent; in sectivorous. "An active fly-catcher."

9. *D. æstiva*, (Gmel.,) Bd., yellow warbler. Summer resident, frequent; insectivorous. "Feeds on the smaller insects, and a variety of small larvæ and caterpillars."

Observation.—Nuttall remarks: "It is amusing to observe the sagacity of this little bird in disposing of the egg of the vagrant and parasitic *cow troopial*. The egg being deposited before the laying of the rightful tenant, and too large for ejectment, is ingeniously incarcerated in the bottom of the nest, and a new lining placed above it, so that it is never hatched, to prove the dragon of the brood."

10. *D. maculosa*, (Gmel.,) Bd., black and yellow warbler. Migratory, common; insectivorous. Very active in searching for their insect and larvæ food.

11. *D. tigrina*, (Gmel.,) Bd., Cape May warbler. Migratory, extremely rare, insectivorous. Feeds on insect food, but its habits are little known.

12. *D. palmarum*, (Gmel.,) Bd., yellow red-poll warbler. Migratory, rare in swampy thickets; insectivorous. Industrious insect-eaters.

13. *D. discolor*, (Vieill.,) Bd., prairie warbler. Migratory, rare; found in open woods; insectivorous. "Feeds on caterpillars and flies."

50. Genus *Myiodioctes*, (Aud., 1839.)

1. *M. mitratus*, (Gmel.,) Aud., hooded warbler. Summer resident; very rare so far north, insectivorous. "It flies swiftly after its insect prey, securing the greater part of it on the wing." (Aud.)

2. *M. pusillus*, (Wils.,) Bon., green black-capped warbler. Summer resident, very rare; insectivorous. "It has all the habits of a true fly-catcher, feeding on small insects, which it catches entirely on the wing." (Aud.)

3. *M. canadensis*, (Linn.,) Aud., Canada warbler. Migratory, or summer resident, frequent; insectivorous. A truly insect-catching species. Audubon says: "I found it breeding in the pine forest."

51. Genus *Setophaga*, (Sw., 1827.)

1. *S. ruticilla*, (Linn.,) Sw., American redstart. Migratory, common in dense woods; insectivorous. "He is no pensioner on the bounty of man. He does not wait the accidental approach of his insect prey, but, carrying the war among them, he is seen flitting from bough to bough, or at times pursuing the flying troop of insects from the top of the tallest tree, in a zigzag, hawk-like manner, to the ground." (Nutt.)

52. Genus *Pyranga*, (Vieill., 1807.)

1. *P. rubra*, (Linn.,) Vieill., scarlet tanager. Summer resident, frequent in woods; omnivorous. "Its food consists chiefly of winged insects, wasps, hornets, and wild bees, as well as smaller kinds of beetles, and other shelly tribes." He rarely visits the orchard and tastes the early and inviting, though forbidden cherries." (Nutt.)

2. *P. æstiva*, (Linn.,) Vieill., summer redbird. Summer resident, rare; omnivorous. Habits very similar. Both species become more fructivorous in autumn.

XIII. FAMILY HIRUNDINIDÆ. (THE SWALLOWS.)

53. Genus *Hirundo*, (Linn., 1735.)

1. *H. horreorum*, (Barton,) barn swallow. Summer resident, very abundant; insectivorous. "Its food consists entirely of insects, some being small coleoptera." (Aud.) The swallows, like the swifts, feed entirely on the wing, and thus devour vast numbers of flying insects, which otherwise might annoy us.

2. *H. lunifrons*, (Say, 1823,) cliff swallows. Summer resident, now become frequent; gregarious; insectivorous. Its feeding proclivities are similar to the barn swallow. This bird was unknown here until within the last twenty years. Being gregarious and of a wandering habit, it has established various colonies in the county within the period mentioned. Its curious, bottle-shaped mud tenements may now be seen beneath the eaves of buildings in several localities.

3. *H. bicolor*, (Vieill., 1807,) white-bellied swallow. Summer resident, frequent; insectivorous. "Like all other swallows, it feeds on the wing, unceasingly pursuing insects of various kinds." Once the tenant of the forest, it is fast changing its habits, and in some parts has taken possession of martin-boxes in preference to hollow trees.

54. Genus *Cotyle*, (Boie, 1822.)

1. *C. riparia*, (Linn.,) Boie, bank swallow. Summer resident, abundant, gregarious, insectivorous. The bank swallow builds in holes excavated in the sandy, steep banks of creeks, &c.; hence is more frequent near watercourses, and, consequently, feeds on such insects as inhabit them. Its food, "which consists of small insects, principally of the hymenopterous kind," is taken on the wing.

2. *C. serripennis*, (Aud.,) Bon., rough-winged swallow. Summer resident, frequent; insectivorous. Closely resembling the preceding species, and often associated with it in the same community, until recently the two appear to have been confounded.

55. Genus *Progne*, (Boie., 1826.)

1. *P. purpurea*, (Linn.,) Boie, purple martin. Summer resident, abundant; gregarious and insectivorous. Familiarly domiciled in the martin-box, our bird seems specially commissioned to rid the neighboring premises of noxious insects. "The food of the martin is usually the larger winged insects, as wasps, bees, large beetles, such as the common *Cetonias* or goldsmiths, which are swallowed whole." (Nutt.) "They seldom seize the honey bee." (Aud.)

XIV. FAMILY BOMBYCILLIDÆ, (THE WAX WINGS.)

56. Genus *Ampelis*, (Linn., 1735.)

1. *A. cedrorum*, (Linn.,) Bd., cedar bird, cherry bird. Resident, common, rare in winter; granivorous; an eminently fructivorous species, as its common names imply. Too well known to fruit-growers as the cherry bird, yet, as an *amende honorable*, he feeds in spring on "small caterpillars, beetles, and small insects. For hours together he may be seen feeding on the all-despoiling canker worm, which infests our apple and elm trees." (Nutt.)

XV. FAMILY LANIDÆ, (THE SHRIKES.)

57. Genus *Collyrio*, (Mochr., 1752.)

1. *C. borealis*, (Forst.,) Bd., butcher bird. Winter resident, rare; insectivorous. "Fond of crickets, grasshoppers, and various insects." In winter, when these become scarce, he grows more predatious, seizing small birds, mice, &c., with the vigor and dexterity of a hawk; to which its robust form and hooked bill give it some resemblance.

58. Genus *Vireo*, (Vieill., 1807.)

1. *V. olivaceus*, (Linn.,) Vieill., red-eyed vireo. Summer resident, frequent; insectivorous. Its food consists of insects and their larvæ, especially caterpillars. He is an animated and melodious songster. "Wantonly to destroy these delightful aids to sentimental happiness, ought to be viewed not only as an act of barbarity, but almost as a sacrilege." (Nutt.)

2. *V. gilvus*, (Vieill.,) Bon., warbling vireo. Summer resident, frequent; insectivorous. "The principal food of this species consists of small black caterpillars off the poplars." The most familiar of the vireos, it approaches the orchard and garden, where it carefully searches for insects among the leaves and branches of the trees.

3. *V. noveboracensis*, (Gmel.,) Bon., white-eyed vireo. Summer resident, not common; insectivorous. Like its kindred, its food in spring consists of insects; in autumn, berries are added to its bill of fare.

4. *V. solitarius*, (Wils.,) Vieill., blue-headed vireo. Summer resident, rather scarce; insectivorous. "Its food consists of insects and berries."

5. *V. flavifrons*, (Vieill., 1807.) yellow-throated vireo. Summer resident, not common; insectivorous. Habits similar to those of the preceding species.

Observation.—It is probable that *V. philadelphicus*, (Cassin,) and even *V virescens*, (Vieill.,) may yet occur within the limits of Chester county.

XVI. FAMILY LIOTRICHIDÆ.

59. Genus *Mimus*, (Boie, 1826.)

1. *M. Polyglottus*, (Linn.,) Boie, mocking bird. Summer resident, rare; omnivorous. "Insects, worms, grasshoppers, and larvæ are the food on which they principally subsist when so eminently vocal. In winter, on the berries of the red cedar, wax myrtle, holly, &c., &c." (Nutt.)

2. *M. carolinensis* (Linn.,) Gray, catbird. Summer resident, abundant; omnivorous. This songster, which rivals even the mocking bird itself, and feeds during a large part of the season on the very insect races which are injuring the crops of the cultivator, is often greatly persecuted. "The vulgar name which it bears has served to bring it into contempt with persons not the best judges of the benefits it confers on the husbandman in early spring, when with industrious care it cleanses his fruit trees of thousands of larvæ and insects, which in a single day would destroy, while yet in the bud, far more of it than the catbird would eat in a whole season. But alas! selfishness, al attendant of ignorance, not only heaps maledictions on the harmless out dooms it to destruction. The boys pelt it with stones and destroy its whenever an opportunity presents; the farmer shoots it to save a pear, the

gardener to save a raspberry; and some hate it not knowing why. In a word, excepting the poor crow, I know no bird more generally despised and tormented than this charming songster." (Aud.)

60. Genus *Harporhynchus*, (Cab., 1845.)

1. *H. rufus*, (Linn.,) Cab., brown thrush. Summer resident, common; omnivorous. This is another mimic rival of the mocking bird. "Its food consists of worms and insects generally; also caterpillars, beetles, and other coleopterous tribes, as well as various kinds of berries." (Nutt.) He may scratch a few hills of corn or plunder a few cherries, but rest assured that his services have already paid for these; and his music, while it is sweeter, will cost less than that of the flute or the piano.

61. Genus *Thriothorus*, (Vieill., 1816.)

1. *T. ludovicianus*, (Lath.,) Bon., Carolina wren. Resident, frequent; insectivorous. This has much the habit of the common house wren, exploring dark nooks and corners, and piles of wood, brush, &c., where it finds spiders, moths, and other insects in abundance. Its powers of song and mimicry are excelled by few birds.

2. *T. bewickii*, (Aud.,) Bon., Bewick's wren. Resident; insectivorous; Nearly related to the foregoing, its habits are very similar, feeding on spiders, moths, and other insects.

62. Genus *Cistothorus*, (Cab., 1851.)

1. *C. palustris*, (Wils.,) Cab., long-billed marsh wren. Summer resident, frequent about marshes; insectivorous. Feeds on aquatic insects and others which frequent wet places.

2. *C. stellaris*, (Licht.,) Cab., short-billed marsh wren. Summer resident, frequent; insectivorous. Habits similar to the preceding. Secluded among the brushwood and rank grass of their favorite swamps, they elude observation.

63. Genus *Troglodytes*, (Vieill., 1807.)

1. *T. ædon*, (Vieill., 1807,) house wren. Summer resident, common; insectivorous. "Our bird keeps up frequent squabbles with his neighbors, like other busybodies that are never happy but in mischief. He is still, upon the whole, a real friend to the farmer and horticulturist, by the number of injurious insects and their destructive larvæ, on which he and his numerous family subsist." (Nutt.)

2. *T. americana*, (Aud., 1834,) wood wren.

Observation.—This is perhaps too near the preceding species to warrant a separate notice.

3. *T. hyemalis*, (Wils.,) Vieill., winter wren. Winter resident, frequent; insectivorous. Its habits are much like those of the house wren; but is distinguished by season, the length of the tail, and the food which season may afford.

XVII. FAMILY CERTHIIDÆ, (THE CREEPERS.)

64. Genus *Certhia*, (Linn., 1735.)

1. *C. americana*, (Vieill.,) Bon., American creeper. Resident, frequent, but eludes observation; insectivorous. "Its food consists chiefly of ants, larvæ, and small insects, and small particles of lichens; and if one be placed near the nose, it is generally found to emit an odor like that of ants." (Aud.)

65. Genus *Sitta*, (Linn., 1735.)

1. *S. carolinensis*, (Gmel., 1788,) white-bellied nuthatch. Resident, frequent; insectivorous. "It searches and shells off the bark, in quest of his lurking prey of spiders, ants, insects, and their larvæ in general. (Nutt.)

2. *S. canadensis*, (Linn., 1766,) red-bellied nuthatch. Winter resident, rare in forests; insectivorous. The scarcity of insect food in winter often obliges our sojourner to resort to the seeds of the pine for subsistence.

XVIII. FAMILY PARIDÆ, (THE TITMICE, ETC.,)

66. Genus *Polioptila*, (Sclat., 1855.)

1. *P. cærulea*, (Linn.,) Sclat., blue-gray flycatcher. Resident, frequent in summer; insectivorous. "A very dextrous, lively insect-hunter; among other small insects, it preys on the troublesome mosquitoes. (Nutt.)

67. Genus *Lophophanes*, (Kaup., 1829.)

1. *L. bicolor*, (Linn.,) Bon., tufted titmouse. Resident, frequent; insectivorous. This well-known species seeks its food in summer in crevices and among rotten wood; in winter it has recourse to seeds and small berries, in addition to refuse from the kitchen and garbage from the butcher's stalls.

68. Genus *Parus*, (Linn., 1735.)

1. *P. atricapillus*, (Linn.,) black-capped titmouse. Resident, frequent; insectivorous. "Feeds on insects, their larvæ, and eggs of destructive moths: especially those of the canker worm, as well as every sort of small fruits, berries, and seeds."

2. *P. carolinensis*, (Aud.,) Carolina titmouse. Summer resident, rare; insectivorous. Has the habits of the black cap.

XIX. FAMILY ALAUDIDÆ, (THE LARKS.)

69. Genus *Eremophila*, (Boie, 1828.)

1. *E. cornuta*, (Wils.,) Boie, shore lark. Winter resident, frequent; granivorous. "Their food consists of various kinds of seeds which remain on the grass and weeds, and the eggs and dormant larvæ of insects when they fall in their way." (Nutt.)

XX. FAMILY FRINGILLIDÆ, (THE SPARROWS.)

70. Genus *Pinicola*, (Vieill., 1807.)

1. *P. canadensis*, (Briss.,) Cab., pine grosbeak. Winter resident, very rare; granivorous. "Its food consist of buds and seeds of almost every sort of trees, and occasionally a passing insect."

71. Genus *Carpodacus*, (Kaup.. 1829.)

1. *C. purpureus*, (Gmel.,) Gray, purple finch. Winter resident, frequent; granivorous. "Its food is chiefly seeds and berries of red cedar, &c., with a sprinkling of insects and larvæ."

72. Genus *Chrysomitris*, (Boie,) 1828.

1. *C. tristis*, (Linn.,) Bon., American goldfinch. Resident, common; rare in winter; granivorous. Its food consists of many kinds of small seeds, especially of the thistle, lettuce, and other composite plants. Many pernicious seeds are thus destroyed.

2. *C. pinus*, (Wils.,) Bon., pine finch. Winter resident, rare; granivorous. Consumes the seeds of the thistle and allied plants, and those of the pine tree.

73. Genus *Curvirostra*, (Scop., 1777.)

1. *C. americana*, (Wils.,) red crossbill. Winter resident, very rare out of the pines; granivorous. Affects pine forests, the peculiar structure of its bill having a peculiar adaptation for extracting seeds from the cones.

2. *C. leucoptera*, (Gmel.,) Wils., white-winged crossbill. Winter resident, rare away from pine woods; granivorous. Same habits with the preceding species.

74. Genus *Aegiothus*, (Cab., 1851.)

1. *A. linaria*, (Linn.,) Cab.. lesser red-poll Winter resident, very rare; granivorous. Feeds on various small seeds, especially of the alder, buds of the maple, &c.

75. Genus *Plectrophanes*, (Meyer, 1810.)

1. *P. nivalis*, (Linn.,) Meyer, 1825, snow bunting. Winter resident, very rare; granivorous. Feeds on various seeds, grains, and small insects. Mi

gles with the snowbird in its familiar visits to the garden and house yard to glean the refuse from the kitchen. It is then noted as the white snowbird.

2. *P. Lapponicus*, (Linn.,) Selby, Lapland longspur. Winter resident, very rare; granivorous. "Its foods consists chiefly of seeds, and also of grass, leaves, buds, and insects."

76. Genus *Passerculus*, (Bon., 1838.)

1. *P. Savanna*, (Wils.,) Bon., Savanna sparrow. Summer resident, common; granivorous. It subsists on various grass and other seeds, with such small insects and larvæ as may fall in its way.

77. Genus *Pooecetes*, (Bd., 1858.)

1. *P. gramineus*, (Gmel.,) Bd., bay-winged bunting. Resident, common in summer, rare in winter; granivorous; feeds on the seeds of grasses and a spice of the more savory insects. In search of the latter it sometimes visits ploughed fields.

79. Genus *Coturniculus*, (Bon., 1838.)

1. *C. passerinus*, (Wils.,) Bon., yellow-winged sparrow. Summer resident, frequent; granivorous; dwells among grass, where its food, the grass-seeds, is abundant. It delights to add a few insects to its common fare.

2. *C. henslowi*, (Aud.,) Bon., Henslow's sparrow. Summer resident, very rare; granivorous; habits similar to those of the preceding species.

80. Genus *Zonotrichia*, (Sw., 1831.)

1. *Z. leucophrys*, (Forst.,) Sw., white-crowned sparrow. Winter resident, not common; granivorous; subsisting on grass-seeds, berries, coleopterous insects, &c.

2. *Z. albicollis*, (Gmel.,) Bon., white-throated sparrow. Winter resident, frequent; granivorous; habits similar to the last.

81. Genus *Junco*, (Wagler, 1831.)

1. *J. hyemalis*, (Linn.,) Sclat., snowbird. Winter resident, very numerous; granivorous. Every one must be familiar with this little accompaniment of cold and storm, as it picks its scanty fare of grass and other seeds from the lawn, the garden, or the yard, wherever the winds or the housewife's broom have left the ground uncovered with snow.

82. Genus *Spizella*, (Bon., 1838.)

1. *S. monticola*, (Gmel.,) Bd., tree sparrow. Winter resident, frequent; granivorous. Sometimes seen during winter in company with the snowbird, and feeding in a similar way.

2. *S. pusilla*, (Wils.,) Bon., field sparrow. Resident, common in summer; granivorous. "The food of this species consists of seeds and insects. They search the leaves and branches for moths, of which they seem to be fond."

3. *S. socialis*, (Wils.,) Bon., chipping sparrow. Summer resident, very common; granivorous. Its habits resemble those of other small sparrows; but being confiding and self domesticated, it feeds and breeds among the trees and shrubbery in our orchards, gardens, and yards, and even boldly crosses the threshold to pick the crumbs which accident or design may have thrown in its way.

83. Genus *Melospiza*, (Bd., 1858.)

1. *M. melodia*, (Wils.,) Bd., song sparrow. Resident, common; granivorous. This lovely songster dwells in the orchard and garden, where it subsists on small seeds and insects. In winter it often associates with the snowbird, and exhibits the same familiar habits. Its song is one of the earliest harbingers of spring.

2. *M. lincolnii*, (Aud.,) Bon., Lincoln's sparrow. Migratory; extremely rare; granivorous; habits resemble those of the former species; "feeds on seeds, berries, and insects."

3. *M. palustris*, (Wils.,) Bd., swamp sparrow. Migratory, frequent in

per localities; granivorous. "Feeds principally on the seeds of grasses, with few insects." (Aud.)

84. Genus *Passerella*, (Sw., 1837.)

1. *P. iliaca*, (Merrem,) Sw., fox-colored sparrow. Winter resident, frequent; granivorous. During their winter sojourn they frequent brier patches and thickets to search among the fallen leaves for seeds and the remains of insects, larvæ, &c.

. Genus *Euspiza*, (Bon., 1838.)

1. *E. americana*, (Gmel.,) Bon., black-throated sparrow. Summer resident, common; granivorous. "Their food consists of seeds, eggs of insects, and in the early part of summer of caterpillars and small coleopterous insects." (Nutt.)

2. *E. townsendii*, (Aud.,) Bd., Townsend's sparrow. Summer resident, unique; granivorous. Its food inferred from analogy to be, as in other sparrows, seeds and insects.

Observation.—The following extract from my diary may be properly introduced here:

"NEW GARDEN, 11*th of 5th month*, 1833.—This morning my friend John K. Townsend, in company with John Richards, while in quest of birds for my cabinet, shot a bunting in William Brown's cedar grove, near New Garden meeting-house, which is believed to be a nondescript. We have given it the provisional name of *Euspiza albigula*, or white-throated bunting. The following brief description was drawn from the recent bird before it was skinned: Male. Upper mandible, black; middle edge, white; lower, light blue, with a longitudinal stripe extending half way from the point to the base; head, dark plumbeous; checks and breast, lighter plumbeous; line over the eye, white; back, varied with black and brown; the first and second primaries, equal and longest; the two lesser coverts edged with paler; throat, white, margined with black, extending down upon the breast, beneath which is a small spot of ocherous; sides, plumbeous; belly and vent, brownish white; length, 5¾ inches; extent 9 inches." (The sex was determined by subsequent dissection.)

86. Genus *Guiraca*, (Sw., 1827.)

1. *G. ludoviciana*, (Linn.,) Sw., rose-breasted grosbeak. Summer resident, very rare and recluse; granivorous. "The food of this beautiful bird consists of the seeds of cereal plants, of grasses, and those of different kinds of berries, along with insects, &c." (Aud.)

2. *G. cærulea*, (Linn.,) Sw., blue grosbeak. Summer resident, very rare; granivorous. They feed on grains, hemp-seed, millet, and the kernels of different sorts of berries.

87. Genus *Cyanospiza*, (Bd., 1858.)

1. *C. cyanea*, (Linn.,) Bd., indigo bird. Summer resident, frequent; granivorous. "The usual food of this species is insects, and various kinds of seeds." (Wils.)

88. Genus *Cardinalis*, (Bon., 1831.)

1. *C. virginianus*, (Briss.,) Bon., cardinal grosbeak. Resident, frequent; granivorous. "Indian corn constitutes their chief and favorite food when attainable. The seeds of apples, cherries, and of many other sorts of fruit, are also eaten by them."

89. Genus *Pipilo*, (Vieill., 1816.)

1. *P. erythropthalmus*, (Linn.,) Vieill., towhee bunting. Summer resident, common; granivorous. He scratches continually among fallen leaves along the fences, in thickets, and brier patches, in quest of the seeds, and worms, &c., which are concealed there.

XXI. FAMILY ICTERIDÆ.

90. Genus *Dolichonyx*, (Sw., 1827.)

1. *D. oryzivorus*, (Linn.,) Sw., reedbird, bobolink. Migratory, frequent in

season; granivorous. The reed or wild rice of all our tide-water mars in autumn, the essential food of this bird. To this may be added grain grass-seeds generally, with insects of various kinds, grubs, mayflies, and pillars. They sometimes collect in very numerous flocks, and if they to alight on a grain field, either ripe for harvest or newly sown, the fa use the language of Wilson, "may look upon them as a devouring scourge worse than a plague of locusts."

91. Genus *Molothrus*, (Sw., 1831.)

1. *M. pecoris*, (Gmel.,) Sw., cow blackbird. Summer resident, al omnivorous. To the ordinary habits of the common blackbird it adds following cattle in the pasture, to feed on the insects which are attra by their ordure. Some say it is to feast on the intestinal worms dropped by cattle at certain seasons of the year.

Observation.—The cow buntings have ever been a race "of foundl They are remarkable for a total want of the natural instincts of n ny. They do not provide themselves a nest; they never incubate their own e ; they feel no parental care for their young, which they never nurse. Like European cuckoos, they possess a wonderful degree of instinctive cunn employing the maternal instincts of other birds for the performance of t wn parental duties, which they ignobly refuse to render. The offspring or foster-mother is generally sacrificed in her attempt to raise the found another.

92. Genus *Sturnella*, (Vieill., 1816.)

1. *S. magna*, (Linn.,) Sw., meadow lark. Resident, common; omnivor "Their food consists of caterpillars, grub worms, beetle, and grass-seeds." (W

94. Genus *Icterus*, (Briss., 1760.)

1. *I. spurius*, (Linn.,) Bon., orchard oriole. Summer resident, freq ; insectivorous. "I have good reason for believing that the species of insect which he feeds are almost altogether such as commit the greatest depred on the fruits of the orchard." (Wils.)

2. *I. baltimore*, (Linn.,) Baltimore oriole. Summer resident, frequent; insectivorous. Their food consists of worms, caterpillars, beetles, and bugs, p ticularly one of a brilliant glossy green, (the goldsmith.) In autumn a species partake of seeds and small berries.

95. Genus *Scolecophagus*, (Sw., 1831.)

1. *S. ferrugineus*, (Gmel.,) Sw., rusty blackbird. Migratory, frequent; nivorous. They feed on grasshoppers and other insects, berries, &c., and in tumn, on corn.

96. Genus *Quiscalus*, (Vieill., 1816.)

1. *Q. versicolor*, (Linn.,) Vieill., crow blackbird. Summer resident, very abundant; omnivorous. "Every industrious farmer complains of the mischief committed on his corn by the crow blackbird. But were I placed in his situation, I should hesitate whether to consider these birds most as friends or enemies, as they are particularly destructive to almost all the noxious worms, grubs, and caterpillars that infest his fields; which, were they allowed to multiply unmolested, would soon consume nine-tenths of all the production of his labor, and desolate the country with the miseries of famine." (Wils.)

XXII. FAMILY CORVIDÆ, (THE CROWS.)

97. Genus *Corvus*, (Linn., 1735.)

1. *C. carnivorus*, (Bartram, 1793,) raven. Resident, now very rare or extinct; omnivorous. Audubon writes: "The more intelligent of our farmers are well aware that the raven destroys numberless insects, grubs, and worms; that he kills mice, moles, and rats whenever he can find them; that he will seize the weasel, the young opossum, and the skunk; that, with the persever-

nce of a cat, he will watch the burrows of the fox, and pounce on the cubs." * * "Yes, good reader, the farmer knows all this well, but he also knows his power, and, interfere as you may, with tale of pity or of truth, the bird is still a raven." (Aud.)

2. *C. americanus*, (Wils.,) Aud., American crow. Resident, very abundant; omnivorous. This more familiar epitome of the raven is known to every one. "Our crow feeds on fruits, seeds, and vegetables of almost every kind; it is equally fond of snakes, lizards, frogs, and other small reptiles. It looks upon various species of worms, grubs, and insects as dainties; and, if hard pushed by hunger, will devour even putrid carrion. It is fond of the eggs of other birds, and it plunders the fields of their superabundance. It is blamed for so doing, but seldom praised when it chases the thieving hawk from the poultry yard." (Aud.) With such a ledger it is often difficult for the farmer to settle the accounts with his tenant to mutual satisfaction.

3. *C. ossifragus*, (Wils.,) fish crow. Resident, rare; omnivorous. The fishing habits of this crow lead it more about the water, where it finds many aquatic insects, reptiles, &c.; otherwise it is a mere epitome of its older brother.

98. Genus *Cyanura*, (Sw., 1831.)

1. *C. cristata*, (Linn.,) Sw., blue jay. Resident, common; omnivorous. This gay and gaudy bird has very much the same habits as its more sombre relatives, the crows. Like them his organs of destructiveness and acquisitiveness are very large, without a sufficient balancing power. He is both cruel and dishonest. He feeds indiscriminately on flesh, reptiles, insects, seeds, and fruits.

XXIII. FAMILY COLUMBIDÆ, (THE PIGEONS.)

99. Genus *Ectopistes*, (Sw., 1827.)

1. *E. migratoria*, (Linn.,) Sw., wild pigeon. Wandering; at times very abundant and gregarious; granivorous; feeds on beech mast, acorns, grains, and seeds of various kinds. It sometimes attacks the newly sown grain of the farmer, and when the flock is large, does much injury.

100. Genus *Zenaidura*, (Bon., 1854.)

1. *Z. carolinensis*, (Linn.,) Bon., turtle dove. Resident, frequent; granivorous. It feeds on small acorns, various kinds of grains and seeds; also on the fruits of the dogwood, holly, poke, &c.

XXIV. FAMILY PHASIANIDÆ, (THE TURKEYS.)

101. Genus *Meleagris*, (Linn., 1835.)

1. *M. gallopavo*, (Linn., 1766,) wild turkey. Resident, perhaps extinct in this county; omnivorous. The turkey in a wild state feeds on nuts, acorns, grains, and berries, together with various insects, tadpoles, lizards, &c. The domestic bird has the same habits, but feeds especially on grasshoppers and the seventeen-year locusts when abundant, on which they become fat. The great destruction of insect pests by turkeys, added to their market value, makes them a profitable crop for the farmer.

XXV. FAMILY TETRAONIDÆ, (THE GROUSE.)

102. Genus *Cupidonia*, (Reich., 1850.)

1. *C. cupido*, (Linn.,) Bd., pinnated grouse. Resident, now become extinct in this country; granivorous. Their food consists of acorns, of the dwarf-oaks, fruits and berries, and the buds of trees, especially the apple tree, and sometimes insects, such as grasshoppers, &c. Audubon says: "I have counted more than fifty on a single apple tree, the buds of which they entirely destroyed in a few hours."

103. Genus *Bonassa*, (Steph., 1819.)

1. *B. umbellus*, (Linn..) Steph., ruffed grouse, pheasant. Resident, frequent; granivorous. The habits and food are very similar to those of the pinnated grouse. During the snows of winter, when their favorite berries have been exhausted, or are concealed, they feed on various buds, &c., and may then be found in the trees of the apple orchard.

104. Genus *Ortyx*, (Steph., 1819.)

1. *O. virginianus*, (Linn..) Bon., partridge, quail. Resident, common; granivorous. "The food of the partridge consists of grain, seeds, insects, and berries of various kinds. Buckwheat and Indian corn are particular favorites." (Wils.) In winter it becomes more familiar, and sometimes enters the farm-yard to feed with poultry.

WATER BIRDS.

XXVI. FAMILY ARDEIDÆ, (THE HERONS.)

105. Genus *Botaurus*, (Steph., 1819.)

1. *B. lentiginosus*, (Forst.,) Steph., American bittern. Resident, not common; piscivorous. The habits and food of this bird do not appear to differ essentially from the last.

106. Genus *Butorides*, (Blyth., 1849.)

1. *B. virescens*, (Linn..) Bon., green heron. Summer resident, frequent; piscivorous. "Small fish and frogs are his principal food, with small reptiles and aquatic insects."

XXVII. FAMILY CHARADRIIDÆ, (THE PLOVERS.)

107. Genus *Charadrius*, (Linn., 1735.)

1. *C. virginicus*, (Wils.,) Borkh., golden plover. Migratory, frequent; insectivorous; feeds on insects, worms, grasshoppers, small shell fish, and sometimes a few seeds and berries, according to season.

108. Genus *Aegialitis*, (Boie, 1822.)

1. *A. vociferus*, (Linn.,) Bon., killdeer, plover. Resident, or nearly so, frequent; insectivorous; feeds on various insects, grasshoppers, snails, and worms.

109. Genus *Squatarola*, (Cab., 1817.)

1. *S. helvetica*, (Linn.,) Cab., black-bellied plover. Summer resident, rare; insectivorous; feeds on insects, water snails, worms, and in season on small berries.

XXVIII. FAMILY SCOLOPACIDÆ, (THE SNIPES.)

110. Genus *Philohela*, (Gray, 1841.)

1. *P. minor*, (Gmel.) Gray, woodcock. Resident, frequent; insectivorous. The food of the woodcock consists principally of earth worms and such other insects and worms as occur under fallen leaves and in soft bogs, which it probes with its long slender bill, and which is so sensitive at the tip as to enable the bird to discover and drag out its prey.

111. Genus *Gallinago*, (Leach, 1816.)

1. *G. wilsonii*, (Temm..) Bon., Wilson's snipe. Summer resident, or very rare in winter; insectivorous. They continually bore in marshes, like the woodcock, for food, which appears to consist of worms, leeches, and water spiders.

112. Genus *Gambetta*, (Kaup., 1829.)

1 *G. melanoleuca*, (Gmel.) Bon., tell-tale tattler. Summer resident, not frequent; insectivorous; affects marshy meadows and margins of streams "Feeds on small fish, insects, worms, water snails, &c." (Aud.)

. *flavipes*, (Gmel.,) Bon., yellowshanks, tattler. Summer resident, fre-
ısectivorous; nearly related to the last. "Feeds on fishes, shrimps,
nd aquatic insects." (Aud.)
enus *Rhyacophilus*, (Kaup., 1829.)
. *solitarius*, (Wils.,) Bon., solitary sandpiper. Summer resident; in-
us. Feeds on caterpillars, water insects, spiders, &c., &c.; mostly
out muddy ponds and ditches.
enus *Tringoides*, (Bon., 1831.)
. *macularius*, (Linn.,) gray-spotted sandpiper. Summer resident,
; insectivorous. Feeds on insects and worms, which it often seeks by
the marsh mud.
enus *Actiturus*, (Bon., 1831.)
. *Bartramius*, (Wils.,) Bon., Bartram's sandpiper. Summer resident.
; insectivorous. Feeds on coleopterous insects, crickets, grasshoppers,
etimes on the seeds of grasses.

FARMERS' BOYS.

BY MRS. L. B. ADAMS, DETROIT, MICHIGAN.

ACT is more evident among farming communities than that the boys
niversally grow up with a distaste for farm pursuits. No sooner are
age than they turn to seek for more varied if not less laborious duties
and city life. Thus agriculture is yearly robbed of what should be
gth and hope; the places these boys should have been qualified to fill,
uld have filled, with the gathered wisdom of experience aided by the
progressive science, are left to doubtful experimenters; while aged
deserted at a time when filial care is most needed, can only look upon
eliness and say, "there must be something wrong somewhere."
in regard to farmers' boys, there has been "something wrong" a great
In the first place, many of them never should have been farmers' boys
least not farm boys, though they may happen to have been born upon
It is not every nature, even among boys, that is or can be accommo-
the requirements of such an occupation, though parents are far too
think that being boys a farm is the only proper place for them, and
ons best suited to them in the warfare of life the shovel and the hoe.
ysical, mental, and intellectual peculiarities are seldom taken into con-
n. The strong, rough nature, the delicately organized, sensitive one,
one with a craving hunger for the intellectual or scientific, are all kept
on the farm that they may grow up and be taught to work, out of
on's way. The father invests them like so much capital, on which he
ive a per diem interest in the improvements of his farm, and works
the limit of endurance under sanction of a short-sighted interpretation
ophism of "securing the greatest good to the greatest number." The
es of the family, it is thought, justify the sacrifice of individuality.
sual expectation is, that when the pecuniary ends of the farmer are
ished, or the boys grown out of his hands, they will accept a portion
ny acres each, and settle down to plod through the same routine with
t generation. Much seeming wisdom and parental affection are thus
ed; but the wisdom too often proves unwise, and the affection only a

mistaken form of well-developed selfishness. The possibility is, that ou family of three or five one may fulfil the desire of anxious parents, acce acres, and, with the homestead in prospect, settle down to be the stay o old age; but the greater probability is, that as soon as legally free, Natu assert her claims in each, and they will go out into the world seeking f life that should have been theirs through early years of preparation for i having been cheated of that preparation, neither the world nor parent wonder if they come forth ill-developed, discontented spirits, seeking places and finding them not.

As farming has heretofore been considered a business that any ignc might engage in successfully, it has not been thought necessary to ligl brighten the labors of the farm by any rays of science or gleams of gence from the world of thought and action without. Work was u thing wanted from sunrise till bedtime, and the physical nature, often wrought, had neither strength nor sympathy to give to the mental, wh course grew dwarfed and distorted in the unnatural atmosphere. St against it as they might with bits of candle and lighted firebrands in the ney corner, overwearied nature has been more than a match for fancy, p phy, and metaphysics; and where one boy with such culture has come perfect man, mentally, morally, and physically, nine hundred and nine have proved unhappy failures.

Boys on the farm, as well as in college, have a future before them, and be educated in reference to the place in that future which their natural a entitle them to fill. Parents who do not act upon this principle, but drive their boys like horses or oxen to the plough, will find their farm in ments paid for at a dear rate, and need not wonder at finding ther deserted and left to a lonely old age.

The class of farmers now fast coming upon the stage are beginning t that they must progress with the times, that they must admit science an lect into their fields and barnyards where they want their boys to work, boys will soon grow restless, performing their labor like so muc drudgery, and longing for their days of freedom when they can go o the world and be like other people; and they will go, as generations pa found to their sorrow, unless employment is given to the brains as to the hands. Formerly it was not thought necessary for farmers t brains at all; at least, it was not supposed that there was any neces using them in connexion with farming operations. The main thing work, and anybody with ordinary senses and two good stout hands co that. It all did very well, perhaps, in those quiet old times, wl generation trudged on after another oblivious of the existence of elen water, earth, and air, that were waiting but the electric touch of sci make them burst forth into the blaze of light, flash after flash of whi startled the agricultural world with new developments almost num during the past ten or twenty years.

How obstinately the mass of those old-time farmers shut their eyes the light! They had their hands and hoes and ploughs and oxen; wi had they for brains or brain work in books or papers? They close doors against knowledge, and put up their bars and padlocked thei against any threatened innovations of science. It was work they wan the girls in the house, and work they wanted of the boys in the fields. A boys and girls did work, but they were listening and looking too—and ing. Listening to the sounds of new life waking in the world without, l with great longing toward the distant and forbidden lights, and thinki as they should have been taught to do, how they might kindle new fi their own hearthstones; not how they might open the gates of prejudic in something of the life that so tempted them from without; but only

:n they should be legally free from parental control, and at liberty to
ir backs upon the old homestead and the monotonous drudgery of farm
ther and forever.

has been what thousands of farmers' sons and daughters have done,
hat thousands more will do, till farmers as a class are willing to wel-
provement, to seek for light, and use it when they get it. They are
to do so gradually, individually. The good leaven thrust into the old
)s by diligent and earnest thinkers is working and spreading. Men see
y in the light of science can labor such as the farm requires be made
'e and elevating. It is true, men and boys can dig and plough and sow
) in the old way, and make a living at it; but the further behind the
ey are, the more frequent will be the desertions from their ranks of the
nd strong, who bend toward the excitement of change and improve-
young plants bend toward the light of day. Changes, innovations,
ments, are going on everywhere else; why not in the fields and house-
the farmer as well.

ıer way in which great wrong has been done the boys is through the
any parents and sisters have of treating them as inferiors. It is a
oughtlessly acquired, and thoughtlessly practised; but for all that, not
unjust and cruel in its results. It is a very common thing in farmers'
to see great partiality shown the girls in regard to attentions bestowed
rsonal appearance, and time and opportunities allowed for the cultiva-
hose little accomplishments which give young people ease and confi-
ı society and in themselves. It is not thought that the boys, great
llows, with their big hands and rusty boots, have any need of accom-
nts. What company fit to be admitted into the parlor would ever wish
hem, or how could anybody expect that they could be made fit to be
the parlor? Those boys with their coarse, dusty clothes and rough
, indeed; nice chairs and lounges and carpets were not made for such

When company comes to spend the evening, the girls can brush their
p on a clean dress, and assist their parents in entertaining them; but
s are seldom thought of as a part of the family on such occasions.

e in point was where the visitor at a wealthy farmer's house had with-
with the farmer and his wife and two daughters, to the parlor after sup-
hey were social, pleasant people, and the girls exerted themselves to
e evening pass cheerfully. One of them gave some passable music on
)deon, but remarked, looking wistfully at her mother, that her brother
played and sung so much better than she it was a pity he could not
. She was met by the reply that if one of the boys came in all the
st follow, and they were so rough the kitchen was the only place they
for.

ıe boys stayed in the kitchen with the hired man, not because they
t as smart and intelligent as their sisters, but because, as they were only
ıe parlor was too nice for them. They were particularly noticed the
y, and as far as fine forms moved by active limbs, and good features
up by bright eyes could go to make sons to be proud of, there was cer-
ause for parental pride in them; but they were shy of being spoken
ward and ungainly in manner, and ate their meals and went about
rk in a sort of dogged, care-for-nothing way, as if that were all they
nd all they expected to know.

ıer thing was noticed. The house being a large and new one, the
ras not a little proud of it, and desired his daughters to show the com-
rough all the rooms from cellar to garret. Comfort and convenience
to reign everywhere, with but two exceptions—in the parlor and in the
number. There was too much furniture and formality in the former, and
ittle in the latter. The girls had a beautiful, light, airy room, nicely

carpeted. There was a toilet stand with all its tasteful appliances, a table with few books and magazines upon it, and two or three pretty pictures hung again the walls. Passing this, there was a door standing open which gave a view o a large, cheerless looking chamber in which stood two beds in opposite corner There were three windows, two of which were curtained by an old she which had been divided between them, and the other was bare as the glazi had left it. There was no carpet on the floor, no picture on the walls, and t only furniture besides the beds was two or three chairs, a row of clothes l along the wall at one end, and several pairs of coarse boots and shoes und them. One of the sisters stepped on a little in advance and drawing the do shut, remarked, "O, that is only the boys' room; there's nothing in the you'll care to see." Enough was seen, such as it was.

Now, let common sense ask if it is doing the boys justice to treat them s There they are, working faithfully in the fields day after day and year aft year. The fruit of their labor has gone very far towards building and furnis ing the house, and yet what enjoyment have they of it? They get the meals there, and sleep there, and it is called their home. As much may l said of the old watch-dog in the yard. But mothers protest that boys a always so rough, especially farmers' boys; nothing else can be expected of them

Of course not, with such treatment. If they are brought up rude an rough, no one can wonder or blame them if they act so. But should they n in justice have the same chance for life and the full, free, home enjoyment of as their sisters have? Let parents try the boys, and see if they will not improv as well as their daughters in matters of deportment and personal appearanc When they have company let the sons be treated as members of the famil equally entitled to notice and respect as their sisters, and it will soon be foun that they will not be behind in contributing to the interest and entertainmen of the home circle. Furnish their rooms in a way that will be comfortabl and attractive, and see if they do not show a proficiency in the arts of orde and neatness that will convince these skeptical mothers that their sons are c capable of being gentlemen as their daughters are of being ladies. Boy should be encouraged to respect themselves, and to try to be somebody; an should have material given them to do it with. That is, they want a toil table and glass in their room, with combs, brushes, and conveniences for wash ing. It is always to be supposed that they have a second suit to put on occasion requires, and at a very trifling expense a pair of slippers or hou shoes could be provided, so that the heavy dusty boots might no longer stan between them and the parlor door. If mothers and sisters were more though ful, or less negligent and blamable in this matter, there would be fewer dise tented farmers' boys in the world, and there would be far more self [illegible] refinement among farmers than can be found now.

Again, sisters are often in the habit of thinking that it is no matter how the dress or talk when "only the boys" are present. That is the very time the should most care. Home is the one place where, of all others, the boys shou learn how good, how lovely, and loving woman can be. Sisters can be th making or the ruin of their brothers as they choose. By neglect, unkindnes and unattractive ways, they may create in them a dislike of home, which soo results in the acquirement of loose habits, leading to more vicious compan abroad, and too often ending in idleness, profligacy, or crime. Sisters shou give their warm home affections to their brothers; confide in, love, counsel, an encourage them. Above all things should their speech be pure, and their dre and person neat. The boys of to-day are the men of to-morrow; whatev they are made by their home education now, such, in a great measure, will t the character they give to the future homes they are destined to make in th world. A sister's actions should always say, "All that is lovely, virtuous, an pure shall adorn my character, my conversation, and my presence, for the boy

e here, and are taking lessons of me which will be repeated to future genera-
ons." If boys grow up to be noble-hearted, pure-minded men, it is from
omes made pleasant and happy by such mothers and sisters that they spring.
That homely old saying, "Just as the twig is bent the tree 's inclined,"
as no truer application than in regard to the treatment young boys receive
rom their sisters, especially boys reared in the isolation of farm life. In towns
nd villages they are less dependent on home associations, and, in a measure,
ess influenced by them; but on large farms, particularly in our western States,
here neighbors are far apart, there is no other resource, no other nursery or
school for the cultivation of social and domestic virtues. As the boys find the
women of their own households, so will they be very likely to judge of woman-
kind at large. These lessons begin very early in life, too.

A man who is now living, a man of years, a man of the world, remembers
thoughts he had on this subject when but a mere child, and says the memory
of the scene connected with them can never be blotted from his mind while life
lasts. His mother was busy in the kitchen and could not have him there; he
had no brother; his sisters, older than himself, would not let him join their
plays, and he went out and stood alone to think, ankle deep in snow on the
farm-house doorstep. The great cheerless yard before him was a broad, blank
sheet of snow; every rail on the fence was white, great drifted heaps were lying
in the fence corners, the old tree at the north end of the barn had all its arms
full of snow, and the barn itself, and the straw stack with its peaked top, and
the patient cattle standing so still in the yard, all looked like so many icebergs
frozen fast in the midst of a frozen sea. The long rows of corn set up in shocks
n the field below the barn, with their tasselled heads and their snowy blankets
ut half covering their dusky forms, seemed like troops of savages suddenly
hecked in their march, and now standing in sullen silence with their backs to
e storm. Dismal and dreary enough everything looked to the little boy. His
er had gone down to the thick woods to chop, and now and then came up
nging echo of his axe that sounded like music in the cold purple ears of his
. He could not go to his father for the depth of snow that lay between
m; his mother had driven him out of her way, she was a notable house-
per; he heard the cheerful voices and merry laughter of his sisters who had
led him cruel names and sent him from them because he was a boy; and he
od, with the snowflakes melting into his tears, wondering how God would
nish women and girls who were so wicked to little boys.

"Girls," he says, "who treat their brothers as I was habitually treated,
sh out the tenderest, the noblest, and most kindly feelings of our nature;
lings that seldom spring up again in after life, but are too often superseded
a harsh and sullen temper, and a selfishness equal to that which blighted
ir first pure and generous emotions."

Little sisters, therefore, have much to do in forming the characters and tem-
ng the dispositions of their brothers. When a boy has no playmates of his
n sex, girls should conform their amusements in a measure to his boyish
tes; be patient with his awkwardness, and encourage all gentle and amiable
lings, that he may outgrow the harsher qualities of his nature. Thus he may
made an obliging, affectionate boy, and an unselfish, noble, and pure-minded
n, who will respect and honor woman for his sisters' sake.

"Take care of the minutes, and the hours will take care of themselves" is
ther good and true saying applicable to this subject: take care of the boys,
the men will take care of themselves.

ost boys, especially those belonging to farmers, are rough, awkward, un-
ly material to begin with; but look at the block of marble before it is
ped and polished to the perfect statue; or at the ore as it comes rough and
less from the earth, and grows through refining arts and proper mouldings
precious coin that controls the commerce of the world; or the implements

of war that, with voices of thunder and blades of keenest edge, decide the destinies of nations.

Yes; these young boys are rough, ungainly looking little animals to take in hand for the purpose of making gentlemen of them. They are, in this early stage, chiefly remarkable for dirty faces, chapped hands, enormous appetites and a wonderful propensity of knees and toes to go through thick and thin. However thoughtless and improvident the boys may be, these members are pretty sure to be "looking out" for themselves. What a trouble to mothers and what sources of vexation and mortification to ambitious sisters! Yet, in these very boys, looking through their eager eyes, speaking out in their ill-timed inquisitiveness, and manifesting itself in most extraordinary experiments, is the germ of the future perfect man, the fire, the dawning consciousness of power that needs but proper guidance to enable it to control the social and political world. Little barefooted, ragged-kneed, freckled-faced, bright-eyed boys hardly more need be done with them at this stage than to feed them well and let them grow; only watching for, and tenderly encouraging the growth of all that is good in their natures, and sowing with judicious care such seed of good as nature may have been at fault in supplying.

A little further on in life, when the boy-man has outgrown the child, he wants something more than air and sunshine and food; yet wants these not the less, especially the food; the air and sunshine he will have by virtue of his sex and his occupation; the food must come by favor of others, and should be in quantity and in nourishing qualities all that the vigorous growth of bone, muscle and sinew requires. But now little evidences of pride in personal appearance are manifest—toes, knees, and elbows less so. The hair, once seldom attended to voluntarily, is now an object of care; the looking-glass is slily consulted and face and hands are scrubbed to smarting in the secret hope of getting at the bottom of freckles and tan. It is at this age that boys most want sympathy and help from mothers and sisters, and, unfortunately, it is at this very time that they are least likely to get either. It is just here that they are beginning to be valuable as workers, and every moment out of the fields and barnyards looked upon as so much lost time; while the little attentions to personal appearance, if not broadly ridiculed, are made light of or discouraged till the objects settle down in the sullen conviction that it is no matter how they look or what they try to make of themselves. Mothers and sisters are too much occupied in household affairs, and, the latter especially, in little toilet articles for their own adornment, to think or care much about the tastes or wishes of those overgrown, uncouth-looking boys, who never seem fit to be seen anywhere but in the kitchen and back yard.

It is not strange that boys thus shut away from the world, deprived of womanly sympathy, and kept in kitchens and back yards, should [illegible] discontented with farm life, possess neither respect nor veneration for [illegible] turn out at length to be slovens and tyrants in houses of their own.

A word or two now to fathers. Boys have a right to be considered not only members of the family in all its social relations, but as proprietors of the farm they help to till, and the stock they help to raise. It would greatly encourage habits of industry and foster a manly ambition in them if you would treat them more as partners than as servants or mere underlings hired for their board. They should have a sheep, a calf, a lamb, a colt, or [illegible] which they might call their own, and the increase of which should in reality be theirs to be reared or disposed of for their benefit. Give the boy something to begin with, anything of substance enough to establish a proprietorship in; and add to this a patch of ground with time and means for its cultivation, the produce and proceeds of which shall be the boy's own. These little attentions and concessions of right will work wonders towards developing a lad's manliness, and attaching him to the occupation and the homestead of his father.

armers need a hint or two in another matter, also. As a class they are far e niggardly and close with their boys than any other. They keep them e rigidly at work without recreation, allow them fewer holidays, fewer home asures, and less spending money to seek variety elsewhere, than the sons of ents in other employments have. Most others, it is true, live in towns, and re recreations at command which cannot be reached in isolated country life; t even those that do offer to farmers are yielded to, if at all, in a grudging d surly manner that takes half the pleasure from them by damping boyish thusiasm with sordid calculations of time and money wasted. If fathers could ly remember their own boyhood, and make up to their sons the privileges d pleasures that were denied to themselves, there would be much gained to ch successive generation.

First of all, then, parents should not pervert Nature by trying to make farmers their boys when she intended them for something else. But having once ttled the fact that they are to be farmers, or, at least, that their early years e to be spent on the farm, let the home they there help to make be theirs intly with other members of the family, to adorn, to enjoy, to honor, and to ok back upon from the distance of years with pleasant memories. Here is here the true woman's rights movement should have begun, and must begin: educating and training up a race of men attached to home, and loving and noring woman in her relations as mother and sister. The most tyrannic and iberal men are those who have once been tyrannized over, and debarred from e enjoyments and privileges that nature told them should be theirs. When wer does come into their hands they are inclined to use it to excess. Their ghts have been disregarded, their pleasures abridged, their desires made light ; why should they consult the wishes, pleasures, or rights of others?

Begin, then, by making home happy for the boys. If it is a happy home for em, it will be for all. Mothers and sisters hold the destinies of men in their nds, and through them the destinies of future wives, mothers, and sisters o. By the sweet influences they may throw around the fireside and the mestead, they may begin and carry to perfection a grander scheme of moral form than has ever yet originated in the brains of the loudest-mouthed and ongest-minded women of the age. Woman at home is the true reformer, and y, the incipient man, is the true starting point, from which, if she turns her face in e right direction, she may read success in a brighter and not very distant future.

FARMERS' HOUSES

BY DR. W. W. HALL, OF NEW YORK.

WHERE to build and what shall be the plan of the house are questions ch have to be decided every year by thousands and thousands of enter- ing farmers all over the country—either young men just married, who are at "opening" a farm in the boundless west, or by men more advanced in who, having done well, have decided to treat themselves and their faithful es to a new and better house than the one in which they have lived and ven so long and so well together. In either case it is of the first conse- nce, and is necessarily the first step to be taken, after having decided to ld, to fix upon an answer to the question—

WHERE SHALL I BUILD?

Upon the wise decision of this important inquiry depends to a greater or less ent the health, the consequent happiness, and eventual success in life of

A wealthy and retired citizen of New York built for himself a s
mansion up town, about four years ago, anticipating that it would be hi
for life. He had occupied it but a short time, when one by one the m
of his family were taken sick. A strict examination discovered the fa
the house had been erected over a "filling," the emanations from whic
stantly ascending, impregnated every room in the building with del
gases. It was at once abandoned for another home.

The hospitals and barracks in and near Bengal are now almost
having been built in a locality utterly unfitted for human habitations, a
health was concerned. Their erection cost the British government six
millions of dollars. This great waste of money might have been alt
avoided by the application of a very limited knowledge of the causes of

From official papers presented to the British government, it is sho
of each hundred British soldiers in India, ninety-four disappear from th
before the age of thirty-five years, when, from military returns, it is kn
"the average standard of health for Europeans in India would comp

. At the same time, it will afford encouragement to be assured that its re is known, as also some of the laws by which it is regulated, and that by asy attention to them the Samson may be shorn of his locks, and the great royer may either be avoided or rendered as harmless as the gentlest touch ancy. The name of this remorseless destroyer of human life is

MIASM,

m a Greek word, which means *emanation;* that is, arising from, because omes up from the surface of the earth. It is a short word; but it brings ry sickness and agonizing death to hundreds of thousands every year. It l bring sickness and death, sooner or later, to many a reader of this article, a sickness and death which could have been avoided.

sm is the principal cause of nearly every "epidemic" disease; that is, every sickness which "falls upon the people," attacking numbers in any nity, such as fever and ague, diarrhœa, dysentery, cholera, bilious, intermittent, congestive, and yellow fevers. But it is gratifying to know that it n avoidable cause of disease. Money and wisely directed efforts can banish rom almost any locality. All that is needed is to know the laws of miasm, l wisely adapt ourselves to them.

In 1860 one of the daily papers of New Orleans stated:

"The yellow fever has broken out in the city under every conceivable variety of circumces: when the streets were clean and when they were filthy: when the river was high when it was low; after a prolonged drought, and in the midst of daily torrents; when heat was excessive, and when the air was spring-like and pleasant: when excavations disturbances of the soil had been frequent, and when scarcely a pavement had been laid building erected. Almost the only fixed and undeniable fact connected with the disease hat its prevalence is simultaneous with the heats of summer, and that frost is its deadly my."

Here, then, are two important laws of miasm; and scientific observation cted to that special point in all countries confirms the two great truths, t—

First. Miasm prevails in hot weather.

Second. Miasm cannot exist as a cause of disease in cold weather.

Third. An inference is drawn embodying a third law of miasm, which is, it is a cause of disease only from June to October in our latitudes.

Fourth. A fourth law of miasm is confirmed by the now historical fact that three summers yellow fever has not been known as an epidemic in New ans, because, from the scientific views held by those in power in that city e early summer of 1861, it has been kept *well drained.* In other words, s been kept clean and dry.

t is within the memory of the present generation that, some thirty years or more, the city of Louisville, in Kentucky, was one of the most pestiial spots in the habitable west. But by a wise system of filling and drainit is now one of the healthiest, as well as one of the most beautiful cities he great valley.

have, then, arrived at four controlling facts in reference to miasm: that and moisture are essential to its production in any locality; that it cannot where there is severe frost or great dryness.

as it is known the world over that miasm never exists in deserts, where e is nothing but dry sand and a burning heat, it is clear that something s than heat is necessary to cause miasm. But it is further known that n miasm is so malignant in localities where it is certain death to sleep on e for a single night, a man can go a mile and sleep on shipboard, and keep erfect health. This shows that something more than heat and moisture necessary to the production of miasm. The third element is vegetation—hing that grows from the earth in the nature of grass, leaves, or wood

These three things in combination are the great agents for the produc miasm: no two of them can produce it. They all must be present to and for a considerable time, so as to produce destructive decay of the tion, which requires a degree of heat exceeding eighty degrees Fa These three elements will always produce miasm, whether out of doors the influence of the heat of the sun, or on shipboard, or in an uncleanly k by the heat of stoves or fire-places.

If, then, a farmer builds his house over a "filling," he will have sick his household. If he builds on "bottom lands," "made land," where r streams have in the course of years been depositing decaying and dead mud, &c., he will certainly have various diseases in his family, unless a of thorough and constant draining is put in operation.

Ponds, sluggish streams, or any accumulations of water in a producti always yield miasm, and a dwelling in their vicinity will be certainly with miasmatic diseases, unless attention is paid to certain circumstances may modify the result.

Miasm is not supposed to pass a swift-running stream; hence if a runs through a farm, and one bank of it is level and rich, the other high rolling, better far build on the latter, for then the miasm of the flat land cross the stream to the house. If there is no stream, but a pond or fla and the house must be built in the vicinity, build it so that the pre winds from June to October shall blow from the house toward the pond land, for miasm, being a gas or air, is carried before the wind.

It is a hazardous experiment to build on an eminence, if it gradually to the water's edge, or to a low, flat piece of ground, unless there is a of trees or other shrubbery intervening, because miasm, like the clou sometimes "roll up" the side of a hill or mountain. It is known that v growing bushes, or hedges, or trees, between a miasm producing locality dwelling, antagonize the miasmatic influences, the living leaves seem absorb and feed upon the miasm; but there should be a space of fifty y least between the hedge and the house, and the thicker and broader and the hedge the better, and the nearer the leaves are to the ground the be the miasm gropes on the surface in its greatest malignity, and is seldo centrated enough at the height of ten feet to be materially hurtful unless it comes up a slope. Hence in the old cities of the world, in th of plagues and pestilences, the people who could not "go to the count a custom among them to live in the upper stories of their dwellings w sickness raged. They would not even come down stairs to obtain ma but would let down baskets by ropes to the country people for the pr they had to sell. But they failed to discover why the country peopl come to town with impunity, while they themselves were safe fro[illegible] proportion as they lived in the upper stories of their dwellings [illegible] miasm has since been determined, which beautifully unravels [illegible] Miasm is condensed by cold, made heavy, and falls to the ea[illegible] it were, within a foot of its surface; hence is not breathed, unless [illegible] on the ground. On the other hand, heat so rarefies miasm as to make [illegible] paratively innocuous. Hence the coolness of the early morning and down throw the miasm to the surface by condensing or concentrating thus making it heavy; while the heat of the day of a summer's sun so and lightened the miasm as to send it upward to the clouds. The people came to town in the daytime!

Less than fifty years ago the yellow fever and other deadly diseases p in Charleston, South Carolina, and it was known to be certain death, e the very hardy or the acclimated, to sleep in the city a single night; yet chants came to town at midday, under a blistering July sun, with impunity. Hence, from June to October, it is best for farmers' fa

› in the upper stories of their dwellings. In this connexion it is practically ul to know that the most malignant agencies of nature may be rendered nless by a little observation and the wise use of a little knowledge. Miasm ost pernicious about sunset and sunrise, because the cooling of the atmos-re at the close of the day causes it to become condensed above, to become vy and fall to the earth, where it is breathed, while after sundown, it has led so near the earth as to be below the mouth and nostrils; hence it is not athed. When the sun begins to rise in the morning the miasm begins to m and to ascend, but after breakfast it is so high as to be above the point vhich it can be breathed; and besides, it is so rarefied, so attenuated, as to nnocuous. Therefore the great practical truth beautifully follows, that miasm rts its most baleful influence on human health about sunrise and sunset; hence, ll the hours of the twenty-four, these are the most hurtful in which to be out doors, and, for the same reason, the hours of midday and midnight are the st healthful to be in the open air in miasmatic seasons and countries, that is n June to October, north of the thirty-fifth degree of north latitude. But, tunately, the cool of the early morning and the late afternoon are the most asant times in the twenty-four hours for field work, and the industrious farmer l be exceedingly loth to spend these hours in doors, should his house be eady located in a miasmatic situation. There is, however, an almost infal-le preventive of any ill effects arising from such an exposure to miasm about rise and sunset, and one that is easy of practical application under almost y ordinary circumstances, and it ought to be made known and repeated llions of times through the public prints every year, until the information s reached every farmer's dwelling throughout the United States. Farmers, ose houses are already built in malarial districts, such as in low "made" nds, near ponds and stagnant water, or in the neighborhood of sluggish eams or marshy places, may exempt themselves almost altogether from the ole class of malarial diseases, such as diarrhœas, dysenteries, chills and vers of nearly every grade, by eating a hearty and warm breakfast before ey put their heads out of doors in the morning, and by taking their suppers before sundown. The philosophy of the matter is that a hot or hearty al so excites the circulation, and so invigorates the whole frame, that it ac-ires the power of resisting the disease-engendering influences of miasm. A glect of such a simple precaution, in certain districts where malaria is known exist in a concentrated form, is a cause of death so common as to be known l guarded against by the most uneducated laborers. A gentleman, a native he city of Rome, informed the writer that multitudes of agricultural laborers, › have been employed during the day in the low, level, damp fields near the › come into town about sundown, and sleep in the streets and on the steps stoops of houses, in order to avoid the sickly atmosphere of the evening in "marshes." No less a personage than a young king lost his life within years, under the following circumstances: Having to pass the night in one is journeys at a house located in the midst of an extensive lowland or sh, and wishing to be on horseback early in the morning for a hunt, the lord pressed upon him the danger of being out early, and that, at least, he ld take his breakfast first. The impatient youth was observed early next ning sitting at his open window, enjoying, as he thought, the delightful air, blew in upon him, and soon after ordered his horses. He became ill, and of a fever in a few days.

he writer has lived among the Creoles of Louisiana, where vegetation is rank wamps, upon which the hot summer's sun beams with fiery power for many rs every day, but they are proverbially exempt from fevers, as are north-rs, also, who adopt the habits of the Creole—that is, to have their break-, or at least a cup of hot, strong coffee, with milk, brought to their bedsides *ore they get up* of a morning. The value of this practice is known and

appreciated all over the south, so that, while it is greatly better to l house where miasm cannot reach it from ponds, or sluggish streams, or lands, a farmer whose house is already thus situated is not without an remedy in the plan proposed above.

But there is another infallible remedy against miasmatic diseases as to who feel themselves compelled to live in a house exposed to miasm. stated awhile ago that heat so rarefied miasm as to render it innocuo family can be troubled with fever and ague in any ordinary locality wh disease prevails, if from June to October a brisk fire is kindled in th room, to burn for an hour about sunrise and sunset, and if the family are to repair to that room morning and evening, and remain there at lea they get their breakfast in the morning, and their supper at the clos day. It follows, then, that ordinarily, there is nothing unhealthful night air after supper. On the contrary, health would be promoted, portant social benefits would accrue to country neighborhoods, if two nights of every week after tea were spent in friendly visiting, remaining than ten, thus encouraging that interchange of social associations which intelligence, promotes kindly feeling, enlarges the views, expands th and elevates the whole character by cultivating the tastes as to dress, of person, and the imitation or copying after any ornament or impr of the grounds and dwellings of the neighborhood. In this way an ligent, practical farmer in a neighborhood, by occupying a house which built or remodelled for himself, so as to have all the comforts and conv which knowledge and observation and experiment have found to co largely to the health, happiness, and thrift of the occupants, will prove a which shall spread from one habitation to another in a comparativel time, until every dwelling in a circuit of many miles will be more or proved, and thus the face of the whole country be changed for the bett the promise and realization of a further progress onward and upward.

RECAPITULATION.

Although the statements which have been made were presented in co with the selection of the most healthful locality for building a new fam dence, they are practically applicable to all cases wherein it may be d to make a house already built more comfortable and more healthful tha because, from what has been stated, it will be seen that a dwelling erected should not be hastily and blindly abandoned merely on accou insalubrity, for, in the light of the above statements, it may be found causes of any present sickness are of a transient or of a remediable ch which may thus be illustrated.

The most favorable circumstances for the production of a miasma demic—speedy, malignant, and wide-spreading—are the exposure of the bottom of a pond or sluggish stream to the beaming heat of a summer's less than a week whole neighborhoods have been stricken with dise under such circumstances, and according to the well-established laws of five families may dwell within half a mile of a drained mill-pond, and one will suffer from it, while the other four will remain exempt from disease.

First. If a rapid stream of considerable width runs between the drain and the house.

Second. If there is interposed a thick hedge or growth of living, lu trees or bushes. A treble row of sunflowers is known to have answe purpose in repeated cases.

Third. If the prevailing winds from June to October are from th toward the pond.

Fourth. If the house be on a steep hill.

easons for the above exemptions are here shortly recapitulated:
. Miasm does not cross a wide, rapid stream.
id. Miasm is absorbed by thick, living, luxuriant foliage.
l. Miasm cannot travel against the wind.
th. Miasm cannot ascend a high, steep hill.
e no mystery in these variations, nor any complexity, when the laws are thoroughly understood.
u be practically useful for the young farmer, in a pecuniary point of understand, further, that in one year a house on the banks of a mill-sluggish stream may be visited with sickness; the very next year that use may be exempt, because it is a very cold summer; the third year scape, because it is a very hot summer; the fourth year it will be a ilthful habitation, because it has been a very wet summer. Why these is?
Miasm cannot form, or if it does, cannot rise through a foot or two of water, and the wet summer kept the pond covered.
d. The hot summer dried the bed of the pond to dust, and there can iasm without dampness.
. The cold summer did not give the degree of heat necessary to the on of miasm—that is, eighty degrees of Fahrenheit.
principles fully explain the apparent mystery of the epidemics in New already referred to in the first part of this paper.
ustration of the laws of miasm, which the writer will never forget, was ng a cholera summer in Boston, under the following circumstances: r authorities inaugurated a most perfect system of cleanliness. Efforts de to procure the services of the most reliable men to visit every house ar to garret, and compel the removal of everything which could have emote tendency to invite the fearful scourge. The results were ad- there was not a single case of cholera, except in a very restricted dis- fact, only one family was attacked. A more special examination was d, when there was found, in a remote corner of the cellar, a large pile cumulations of bad housekeeping for years, and this was in a state of . On its removal, and the plentiful use of the most powerful disin- the disease at once disappeared, and did not return.

CELLARS IN DWELLING-HOUSES.

a fact like the above staring one in the face, and in connexion with that farmers generally make their cellars the winter and summer re- of every variety of vegetables and fruits, more or less of which are r in a bruised, rotted, or unripe condition, and thus speedily become r fermentation without the aid of much heat, it is apparent that these constantly ascending, and must unavoidably impregnate every room use with a vitiated and unwholesome atmosphere; and in consequence er known fact, and unfortunately almost universal, that the cellar, nvenient and "out of sight" of visitors, is made the receptacle of all ld and unseemly, as well as of kitchen offal, by the laziness of bad pers or unprincipled servants. For these considerations, it is clear ould be better if no cellar should be built under that part of a house to be occupied as a place to eat and sleep and live in, whether in country. But, as in the country, the cellar is regarded as an indis- part of the house, the greatest precaution should be exercised to in- nliness and pure air with ventilation, preventing it from becoming ul source of sickness and suffering.
mily in one of the healthiest villages of Massachusetts a few years father and three children died of an obstinate slow fever, and the nd two other children were "hard at death's door" for weeks. Before

the fatal results, but too late to prevent them, an examination of the house by order of the physician disclosed in the cellar a barrel partly filled with decayed onions, the undoubted cause of the disease. If there is any obscure or slow disease in the family of any reader of this article, and a cellar is attached to the building, it is worth the experiment to secure the following "alterations" as to the cellar: Let the cellar be emptied of every movable thing; let the walls and floor be thoroughly swept, and, if practicable, washed; and after being allowed to "air" for a week or two, have the ceiling plastered. The walls should be smoothly plastered, and the floor covered with a hard cement, thick, smooth, and strong; and both walls and ceiling should be well whitewashed once a year, and the old whitewash should be swept off before the new is applied. The best, because the cheapest and most universally available whitewash, is made as follows: Put unslacked lime, that which is in the form of the original rock, in a vessel; pour boiling water on it until it is covered; place a cloth over the vessel so as to confine the most minute particles of the lime, they being the ones which most perfectly "penetrate" the surfaces to which the wash is applied, and consequently remain the longest. Subsequently dilute the wash to the consistence of thick cream, and apply it thoroughly and thickly, thus accomplishing two objects, a white, light-giving surface, having a "body," as painters term it, which is capable of absorbing, and thus rendering harmless the "bad" airs or gases which may be formed in the cellar.

Every partition and every shelf in a cellar should be made of smoothly planed boards, well covered with good white paint, thus preventing the accumulation of dust, and aiding in making the cellar light, cheerful, and clean; for the more light you can have the better. Every cellar should be so contrived that either by its grating or windows or doors it may be easily and thoroughly ventilated an hour or two at least every day in the year; this is often very perfectly done by a flue running into the chimney.

It is scarcely necessary to remark that if a cellar is liable at any time of the year, even for a few days, to have water rise and stand on the floor, or even to have the floor a little wet, draining tiles should be put under it before the floor is "cemented." All shelves in a cellar should be so arranged that you can go all around them; it is not advisable to put any shelving against a cellar wall; and if all the shelves are suspended from the ceiling, so much the better on several accounts, not the least of which is that more "floor room" is thus obtained.

When a house is to be erected in a new locality, and it has been wisely determined to have the cellar off from the family building, but yet to be easily accessible from the kitchen without having to go "out of doors"—say under the kitchen itself, or under the wood-house, or simply under the ground its roof being a part of the front yard or garden, if you please, but so covered over with soil and grass, bushes, &c., that it would not be known to be there—the next point is to arrange that the foundation of the house should be laid on stone, at least three feet deep, and on a spot descending, if possible, in every direction. The walls of the house should be at least two feet above the surface of the earth, crevices having been left at intervals on each side, so as to admit a free circulation of air, but not large enough to admit mice. There should be an open ditch all around the inside of the wall, as a drain to any dampness, with a sufficient descent, at least at one point, to insure the drain to be passed off.

It is well to plaster a foundation wall inside and out, and to have every stone well laid in a good mortar, not being sparing of lime or sand in its preparation. Too much "loam" or common dirt is generally used, so that the mortar crumbles to powder, has no tenacity, no binding power, instead of hardening and becoming a part of the wall itself.

The space between the lower edge of the joists of the ground floor and the er edge should be filled with dry sand, ashes, or, which is much better, rcoal, for the three-fold object of, first, keeping the lower floor dry; second, ing it warmer in winter; third, absorbing any deleterious gases which it arise from the ground. As to the materials for building, each locality its peculiar conveniences; but it should not be forgotten that wooden lings are best for the country, because they are dryer, and consequently e healthful.

The best kind of roof for a country house is the old-fashioned steep roofs, th a "comb" in the centre, with no "hips" or dormer windows; these may ke a building more picturesque, but they so generally leak that a plain, p, shingled roof is safer, more economical, and more universally available.

WATER.

The first consideration is pure, soft water. That from a spring is most to be desired, and can easily be procured by means of pipes when the spring is above the residence. If the spring is on a level with or below the house, and is copious, with some fall, a portion can be thrown up into a reservoir at the dwelling by means of a water-ram or other simple and unexpensive machinery. And by the same means, and from the same source, the dairy (and, if possible, the barn also) should be well supplied.

If no sufficient spring is convenient, a well (with an old-fashioned pump in it) where soft water can be obtained by digging, is probably the next best source of supply, as it, too, is always cool and lively. Every part of the kitchen, the wash and bake house, the dairy and barn can be supplied from the pump by the aid of pipes, saving much labor at small cost.

But in limestone and other sections where pure soft water cannot be obtained from a spring or by digging, by all means provide a capacious cistern for the dwelling and another for the barn buildings. That is a miserable and costly economy which substitutes barrels, hogsheads, stands, and other such insufficient contrivances to procure rain water for cleansing purposes to save (?) the cost of a good large cistern in the first place! By means of properly constructed filters attached to the cisterns, and by keeping roofs free from pigeons and other poultry, clean pure soft water can always be provided in great abundance; and by the aid of an ice-house (which may be provided in most localities at comparatively small expense) the water can also be made refreshingly cool. But of ice-houses in another place.

The roofs of barn and dwelling will furnish an ample supply of rain water for any farmer's use, and, next to pure spring or well water, it is the most healthful for drinking and bathing, as well as best for cooking and washing. "Hard water," as it is commonly called, not only lays a foundation for many tormenting chronic complaints, but fails to soften meats and vegetables in preparing them for food; and for cleansing purposes it involves expense for additional soap or other alkaline substances, and increased labor in its applications. Even for farm stock it is not as good as soft water, and is very apt to give animals a rough "staring" coat.

But, whatever kind of water, provide it in abundance, and by all means have it convenient for all purposes. The expense of these conveniences will be more than saved in health, in labor, in time, and even in comfort alone. No woman should ever be required to go from the warm kitchen, the steaming wash-tub, or glowing oven, into the cold or damp outer air for a pail of water, when it can so easily and so cheaply be conducted to her hand in the kitchen, bake, and wash-house, or dairy. Many screaming babes (and the sleepless household commiserating the little sufferers) have protested against this un-

thinking barbarity inflicted on them through their much-suffer
And many blooming maidens and useful wives are now "under
the valley" because of colds caught by running out in the b
frosty air for a pail of water while over-heated. And even the
which required these sacrifices has been pained to the very bott
purse by the reflection that the doctor's and undertaker's bills, to
ing of the loss of valuable services, would have far more than
cost of conducting the water to where it was needed for use fr
well, or other reservoir.

But whether spring, well, or cistern be employed, examine them often carefully, and especially each spring and fall, and have them thoro cleansed when needed.

WATER PIPES.

Due care and caution should be used in the selection and use of p conveying and distributing water to the buildings. Where suitable t cheap, the large pipes (or mains) may be most easily and cheaply made of Iron is probably the next in cheapness in some sections. Earthen properly vitrified (hard-burnt and glazed) are sometimes preferred. For distributing pipes, where zinc or tinned pipes cannot be afforded, lead is the common material—and against the action of vegetable matter, and of kinds of water, on this mineral, the utmost caution should be used. water, as the Schuylkill, which supplies Philadelphia, contains an element w forms on the inside of the pipe a film which is absolutely impervious by water, and protects the lead against all corrosion or chemical change. And in cities and large towns, where the water is kept running almost incessantly, time is not allowed for chemical action on the lead, where the same water, through the same pipes, would produce speedy sickness in a farm-house. It is water stagnant in a lead pipe which causes mischief, so that every faucet should be allowed to run the water waste for at least one minute the first thing in the morning, especially in the kitchen. Comparatively little harm would result under ordinary circumstances if, while the leaden pipes are laid, the most special care should be taken as to these points:

Allow no angles in the pipes.

Let every piece of pipe which is horizontal lie perfectly straight.

Have all curves as large as possible.

Have no indentation on the outside of the pipe for this may cause a projection on the inside.

Be at great pains that no pebble or other thing shall be left in the pipe at the time of its being laid.

In all cases (if alone to prevent clogging and uncleanness) have a suitable screen or coarse woollen filter placed at the point where the spring enters the pipes or where the rain water from the roofs pours into the pipes by which it enters the cistern, so as to exclude all moss, leaves, insects, or other matter liable to decomposition.

All these look to one point—that is, the prevention of any sediment lodging at any one point, for where this occurs there will be found the elements of corrosion and chemical change from which the poison comes.

KITCHEN.

All persons of cultivation and refinement must instinctively shrink from cooking in the dark. Hence, it should be arranged that this department should have all the daylight possible, and also that the "back-yard," as it is called, and which is usually in the rear of the kitchen, should have the advantage of abundant sunshine, so as to keep it dry and healthful.

A little sink near a kitchen door-step, inadvertently formed has been known, hough not exceeding in its dimensions a single square foot, to spread sickness rough a whole household. Hence everything of the kind should be studiously oided, so that there should be no spot about a farm-house which can receive l hold standing water, whether it be pure rain from the sky, the contents of h-basin, the slop-bowl, or the water-pail.

As to the shape and size and height of the rooms, each builder must decide himself, according to his taste and the length of his purse. A square ding gives most room for the same money, and a broad hall in the center the building affords greater advantage than any other arrangement.

"High ceilings," as they are called, are now much the fashion, but they more costly in the first place, and occasion an unnecessary waste of fuel. ney are commended for their spaciousness, but they sometimes give a barn-ike appearance to a house, and are never so cosy as rooms which are not quite high.

Winding stairs are objectionable everywhere, but especially in the country, e persons rise by daylight or sooner, and where there are old persons or children, as in haste or darkness there is danger of falling and breaking misjointing the limbs or neck.

It is a great saving in the cost of furniture, if, in the erection of new buildings, and in the modification of old ones, large, light, and roomy closets are plentifully supplied, and with them shelves, hooks, and drawers. Many persons in the country when "dressed" show bad house-keeping and characteristic slovenliness, by having their outer garments marked with innumerable "creases," showing that they have been thrown negligently into a drawer and allowed thus to remain from one "going out" to another. The outer dresses of both sexes should be hung up in closets, protected by doors from dust; and to this end every farm-house should have a great abundance of closet room. These closets should always be large, and all the doors should be hinged within two or three inches of the wall, so that there may be no dark corners for the collection of dust or other improper things, or for the hiding of what is valuable, occasioning the loss of valuable time in searching for it. For the same reason there should be no "closets" arranged under the stairways unless they are lighted in some way.

Every room should be so arranged, if possible, that there should be at least one window opposite another, or a door, so that the room may be speedily and thoroughly ventilated by opening both at the same time. Transoms or movable h over the door are very essential in bed-rooms in securing ventilation.

CHAMBERS.

One of the most general and, at the same time, one of the most pernicious errors in modern architecture, especially in the construction of private dwellings, is founded on the mischievous supposition that almost any place is good enough to sleep in. It is common everywhere to set apart the smallest rooms in the house for sleeping apartments. To show what a ruinous mistake this is, let the reader remember that at least one-third of a man's existence is spent in bed in sleep. Eight hours out of every twenty-four we are in our chambers. And when it is considered that air is essential to health, that without it we cannot live two minutes, it must be of material importance whether we breathe a pure or impure air for a third of our existence. A full-sized man breathes—takes into his lungs—at each breath about a pint of air; while in there all the life-nutriment is extracted from it, and, on its being sent out of the body, it is so entirely destitute of life-giving power that if rebreathed into the lungs again, without the admixture of any pure air, the individual would suffocate—would die in sixty seconds. As a man breathes about eighteen times in a minute, and a pint at each breath, he consumes over two hogsheads of air every hour, or

about sixteen hogsheads during the eight hours of sleep: that is, if a n
put into a room which would hold sixteen hogsheads of air, he would, a
eight hours of sleep, extract from it every atom of life-nutriment, and
die at the end of the eight hours, even if each breath could be kept to
provided no air came into the room from without. But when it is re
that however pure the air of the whole room was at first, it becomes cont
by the first expiration, hence only the first inspiration is pure, and each
thereafter becomes more and more impure unless there is some ve
process going on.

Every individual has, in his own experience, demonstrative proof of t
purity of the air of a room in which a person has slept all night by the "
ness" he has observed on entering a sleeping apartment after a
walk, and this, even when more or less fresh air has been coming in
the crevices about the doors and windows during the whole night. Tne
eminent physiologists, at home and abroad, have estimated that no sleeping ap
ment, even for a single person, should have a floor surface of less than
would equal twelve feet long and twelve feet broad, or one hundred and
four square feet, and eight or ten feet high, or about twelve or fifteen
cubic feet to each sleeper. But the sleeping apartments of hotels,
rooms of ships, steamboats, and steamships, do not average one-third
cubic space to each sleeper. The state-room of a steamer is ordinarily
feet long, seven broad and seven high, and even these are adapted for
sleepers. As, therefore, each out-breathing vitiates the whole air of a ro
a drop of milk will discolor the whole bulk of water in a tumbler, the chamb
for the members of farmers' families should not only be large and commodi
but should be so arranged that a system of ventilation, at least to a small
extent, shall be going on all the time, not only in spite of inattention, but a
system which cannot be easily prevented, which is accomplished by the simple
expedient of having a fireplace in each room which cannot be closed with
screens or "summer blowers;" for by this means a draft will be made by the
cold air coming in at the bottom of the doors and from other places, passing
over the floor towards the open fireplace, driving the heavy carbonic acid gas
before it up the chimney.

For the purpose of more perfect ventilation of each apartment, especially
those which are to be occupied as chambers, the sashes should be so arranged
that they can be let down from above as well as raised from below, for the
reason that the foul air of a room rises to the ceiling in warm weather because
it is lighter than cold air. This makes room for the cold air from without to
rush in at the lower part of the window; thus a "circuit" or draught of air is
soon formed, admitting pure air from below and driving the foul air out of the
room above. But every chamber should be so constructed that a window can be
kept open or raised, more or less, without having the draught come right in upon
the sleeper, and it is safer that whatever draught there is should pass the foot
of the bed rather than the head, because the feet are always covered. Hence
it is not so easy to take cold nor so dangerous. The air blowing in upon a
sleeper's head, for even half an hour, has often caused quinsy, or other form of
sore throat, to prove fatal in the course of a very few days.

Where windows are already constructed so that they cannot be let down
from the top, there is an admirable contrivance by which a draught is less danger-
ous than in from the window recommended above. Have a planed board made
the breadth of the window in length and five or ten or more inches broad, raise
the window, then close the space made, with this board, allowing the lower
part of the window sash to rest on this board so as to hold it in its place.
This allows an open space between the glass of the upper and lower sash,
through which the cold air will come with considerable force, with the current
directed upward, toward the ceiling, thus making it quite safe as to the

y discharging an equal amount by weight—that is, three and a half
twenty-four hours—of effete, decaying animal substance, in the form
e vapor, which we often see condensed in drops upon the window
crowded rooms, rail cars, or other vehicles. These drops, if collected
orated, have been found to leave a thick, putrid mass of animal mat-
h is believed to be quite as injurious as carbonic acid gas if breathed
e lungs; but if not at all injurious, the idea must be abhorrent to every
purity of taking such a substance into our bodies, and incorpora
very blood which is at the next instant to be dashed to the li
food and nutriment.

of 1860 a man named Robertson, his wife, and thr
mouth of sleeping in one small, ill-ventilated room. One
t, the wife woke in a very exhausted state, and four
d in her arms. She immediately aro d a,
th to get out of bed. They next ov r their son
or was also dead, and a daughter of nin arently dy-

place, to be kept burning all night. This creates a draft without much heat, and is a good means of ventilating a sick chamber when wa not desirable, such, for example, as in measles, scarlet fever, and ot diseases, where a cool air, and at the same time a pure one, is an ind means of a safe and speedy cure. But let it always be borne in cold air is not necessarily pure, nor is warm air necessarily impure.

With a little fire in a cold bed-room not only is the chamber kept ven but fewer bed clothes are needed; less clothing does more good next day, there is a freer escape of gases and exhalations from the body of the and the person wakes up in the morning more fresh and vigorous.

Chambers should not only be constructed with a view to a constant, ough, and unpreventable ventilation, but also with an eye to their perfect ary-ness and their free exposure to the sun for the greater portion of each day.

Florence Nightingale, whose beautiful name and more beautiful cha which will go down to posterity with that of John Howard and Dorothea Dix, and others of nature's nobility, writes, after long years of experience with sick and suffering:

"A dark house is always an unhealthy house, always an ill-aired house, always a dirty house. Want of light stops growth and promotes scrofula, rickets, &c., among children. People lose their health in a dark house, and if they get ill, they cannot get well again in it. Three out of many negligences and ignorances in managing the health of houses generally I will here mention as specimens. First, that the female head in charge of any building does not think it necessary to visit every hole and corner of it every day. How can she expect that those under her will be more careful to maintain her house in a healthy condition than she who is in charge of it? Second, that it is not considered essential to air, to sun, and clean rooms while uninhabited, which is simply ignoring the first elementary notion of sanitary things, and laying the ground for all kinds of diseases. Third, that one window is considered enough to air a room. Don't imagine that if you who are in charge don't look after all these things yourself, those under you will be more careful than you are. It appears as if the part of the mistress was to complain of her servants and accept their excuses, not to show them how there need be neither complaints nor excuses made."

In reference to the same subject, and in confirmation of what has been already stated in this article, Dr. Moore, the metaphysician, thus speaks of the effect of light on body and mind:

"A tadpole confined in darkness would never become a frog, and an infant being deprived of heaven's free light, will only grow into a shapeless idiot, instead of a beautiful and responsible being. Hence, in the deep, dark gorges and ravines of the Swiss valleys, where the direct sunshine never reaches, the hideous prevalence of idiocy startles the traveller. It is a strange melancholy idiocy; many citizens are incapable of any articulate speech; some are deaf, some are blind, some labor under all these privations, and are misshapen in almost every part of the body."

I believe there is in all places a marked difference in the healthiness of houses, according to their aspect with regard to the sun, and those are decidedly the healthiest, other things being equal, in which all the rooms are, during some part of the day, fully exposed to the direct light. Epidemics attack inhabitants on the shady side of the street, and totally exempt those on the other side; and even in epidemics such as ague the morbid influence is often thus partial in its labors.

SMOKY CHIMNEYS.

This household calamity can easily be prevented, and always in building new houses; thus, let the throat of the chimney be so constructed that immediately inside of it the space shall be abruptly increased several inches in length and breadth. Let it increase upward for two or three feet, and then be gradually "drawn in" to the dimensions necessary, and let the whole inside of the chimney be plastered with cement, which will harden with time.

A very convenient method of ventilating a room already built is to arrange that one of the panes of glass in the upper sash shall move on a pivot at the

re of each side, so that it can be turned, the upper end outward, the lower inward, or *vice versa;* or, to prevent breakage, a thin board painted white, or a piece of tin or zinc, may be made to replace the glass. A similar arrangement in new houses will have its conveniences. But in every room this device ould be near the ceiling, above the fireplace. For ordinary rooms the orifice should be a foot long and five or ten inches broad, arranged so that a cord will open or close it, without the necessity of getting on a chair or step-ladder.

here should be a door opposite every fireplace. This diminishes the chances of having a smoky chimney, for in fire-time of year the cold air will be always entering the room at the crevices of the door, and in the direction of the fireplace, and upward through the chimney. The draught of a chimney may be increased by the simple expedient of cutting out a small part of the floor with a saw, so that it may be easily replaced after the fire is kindled. No chimney will "draw" well if there is any wall or other thing near which is higher than the chimney itself.

In building a house in the country it will save expense and trouble, besides preparing the way for a great deal of comfort on emergencies, to have a neat opening left for a stove-pipe near the ceiling in every room in the house, so that, in case of excessive cold weather, a common stove for burning wood (or coal) may be put up, and thus have the facilities of making at least each room in the house comfortably warm during any "spell" of bitter cold weather, and warmed, too, at a comparatively small expense; for let it be remembered that with a common fireplace or grate more than one-half the heat goes up the chimney, and is an utter waste. The longer a stove-pipe the more heat is saved in a room; hence the advantage of having the arrangement for receiving the stove-pipe near the ceiling. Many persons, for the sake of appearance, or a mistaken notion of economy as to the cost of pipe, have the pipe adjusted so as to open into the fireplace, by which a very large amount of heat is lost.

Much has been said of the injurious effects of a dry stove air, and to obviate this it has been recommended that a vessel of water be kept standing on the stove. If this is left to be attended to by the servants it is far better to have nothing of the kind, because, unless the pan is of white stone-ware, and is emptied, washed, and filled with pure fresh water every three or four hours, it collects dust, dirt, gases, and emanations which, by being kept warm, generate a most pernicious malaria, which is much more likely to produce disease than a simple dry air. It should be remembered that a room is very little ventilated, and even that very slowly, by simply opening a folding door. Many persons ignorantly, and to their own injury, rely upon this method of ventilation when they sleep in the same room in which a fire has been kept all day; and for this reason, also, every chamber should have a ventilation arranged in the original construction of the house.

The coolest part of a room in warm weather for sleeping is the floor; but, by the operation of the same law of nature, that cool air is heavy and falls to the surface. The healthiest part of a chamber in very cold weather is the higher. A sleeping person consumes two hogsheads of air an hour—that is, deprives it of all its oxygen, and replaces it with carbonic acid gas, which is a negative poison, leaving it so destitute of any life-giving property that the person breathing it will die in a short time. This is the operation going on in a close room where charcoal is burning in an open vessel. The oxygen is consumed in burning the coal, and its place is supplied by carbonic acid.

Cold condenses this carbonic acid, makes it heavy, and causes it to settle on the floor. It has been so condensed by cold as to be made visible in the shape of a snow-white substance, just as the invisible warm moist air by the application of cold is reduced to mist, to dew, to rain-drops, and to solid hail-stones.

There are some localities in Italy and elsewhere into which, if a man and dog come, the dog will die in a minute or two, while his master will remain

uninjured. There was carbonic acid there. It was concentrated, made heavy, and settled on the surface where the dog breathed it; nostrils being four or five feet higher took in none of it. From these practical lessons of very great importance to human health and life

First. There is more need of ventilating a chamber in winter than

Second. There is no advantage, as to health, in sleeping in a very room—cold enough to have ice formed in it during the night. Th of persons who have gone to bed in perfect health at night have up next morning with pneumonia—that is, inflammation of the lungs— died in a few days, because the room was too cold for them, to say the debilitating effect of breathing an atmosphere more or less loaded bonic acid gas, which deprived the system of its ability to resist the a of disease. Had the room been well ventilated, the attack would have severe, or there might have been none at all, because the breathing of a air would have given power to ward off any ordinary attack of sickness. they are the most conclusive reasons for building houses, or remod so as to have the utmost facilities for ventilation.

Really every chamber should have two systems of ventilation—internal and external—so that either may be employed according to the season of the year, and the health and vigor or peculiarity of the sleepers. The internal ventilation—that is, openings above the fireplaces—for feeble persons, or for very cold weather, or in the autumn; the external—that is, through the windows from all out-doors—for the vigorous, and in moderate weather.

To some persons in any latitude, and to all in some sections of the c it is certain suffering to sleep with an open window, especially in Au September; and by understanding the reason of this fully, the necessity removed from some families of selling out, or of building elsewhere.

Before changing a residence on account of its being unhealthful, it sh first be noticed whether it is connected with any special season of the y with any special part of the house, or any particular habit of the persons are attacked; in other words, does the sickness appear during the aut months? Does it appear among that part of the family sleeping on the s side of the house—on the northern side for example—keeping the rooms always more or less damp, or in that part of the building nearest to some pond, or marsh, or sluggish stream, or whether, of several persons sleeping on the same side, only those are attacked who sleep with their windows open?

As a general rule young children, invalids, infirm and old people, should have their chambers during the night ventilated from within, and so should all families living in bottoms on low lands, near ponds, sluggish streams, marshes, or recently cleared lands, especially during the autumnal months, or where there is more or less chill and fever, fever and ague, etc. The reason for this is, that from these localities miasm constantly rises and comes through the open windows upon the sleeper, who breathes it into his lungs corrupting and poisoning his whole blood in a night.

Many cases are given in standard medical publications where persons sleeping in certain parts of a building suddenly became ill, although they formerly had good health, and had occupied the same chambers, and had slept with open windows all the time. But a change of dwelling, or a determination to build elsewhere, should not be hastily made by the farmer, for some standing water may have been drawn off recently for a mere temporary purpose—the repairing of a mill-dam for example—and when reflooded, so as to cover the wet, muddy bottom several feet in water, the sickness will immediately disappear, or a belt of timber between the dwelling and some standing miasm-producing water may have been cut down; if so, a substitute should be provided by planting a thick hedge of sunflowers, or other rapidly growing and luxuriant vegetation.

FARMERS' HOUSES.

The lower floor of every country house should be on the same level
upward taken by domestics and women in the family, is not onl
nditure of strength, (and a large portion of it, too, when it is
r many times a day the cook and housemaid and the wives and
do the household work must go in and out, and pass and repas
m to another,) but it is physiologically a great strain upon tho
ns which are peculiar to the sex; and when too much of it is dor
every day induced which are to embitter the whole after existe
r easy to wink the eye—an inappreciable effort—but if a man a
it a hundred times in succession, its repetition becomes a painful
very easy to step up a step or two, but the strongest will pant an
dred have to be gone up as briskly as an ordinary cook steps ab
It may be said that the objection does not apply because only c
1 at a time; but it must be remembered that those who do housew
rays have something in hand—a bucket of water, a pile of plates,
wood, a scuttle of coal, etc.—and these must be raised that one st
body of the person, altogether weighing between one and tw
ıds. A certain amount of strength is expended in this unneces
ıa however small it is, each repetition of it is that much taken fro
strength with which the person arose in the morning. A purse c
undred dollars is as much depleted by taking out a dollar at a tim
withdrawn, as if the whole fifty were extracted at once.

The kitchen should, as far as practicable, be central to the wl
ving the dining-room on one side, the wood-house, and the place
k, and vegetables on another, unless these are all kept in the cel
previously advised. If, however, the dairy is an important item
n—that is, if it is intended as a source of income, it should be a
means to be on the side of a hill or rising ground, if possible, ov
erwise in such a way that a natural stream should flow through
surplus water of the well, or spring, or cistern should do so;
ans let the dairy be approached from the kitchen by a raised gr
vith a view to have it as dry as possible at all seasons, for this wa
ed over many times a day, and if not dry it dampens the feet a
ngers the health.

WATER CONVENIENCES.

If water is not supplied by artificial means, so as to come into
)y pipes and a faucet, it should be arranged to have the well o
ring deliver its supply in an apartment immediately adjoining t
m the same level, and without going outside of the house. I
ruthfully denied that multitudes of women lose health and life i
rear by having to step out from the dry warm floor of the kitch
)old stones and wet path outside, going to the spring, wood-yard, a
use." And, with the experiences and harrowing narrations v
)0 to physicians from this direction, that farmer is criminally
building a new house or reconstructing an old one, does not arra
ıry and level floor for those who do the cooking, washing, and ge
rk of the family, so as to make dairy, cellar, wood-house, water-
oke-house easily accessible by a dry pathway.

PRIVIES AND WATER-CLOSETS.

The location of these in connexion with a family residence has a
g on the health of any family, or a greater influence on the
than would be supposed by other than a medical practition
ti of a single law of the animal economy in connexion with
stated, which no observant person can truthfully den

the very first importance that the water-closet should be always and i
and easily accessible, as in proportion as this is not the case, the calls o
ture are postponed. This never can be done with impunity, for nature
does anything in vain nor out of time. But it is singular to observe hou
never allows herself, as it were, to be trifled with; if her call is not he
is less and less urgent; her appeals to the nerves of sensation are less and
strong, until they cease to be felt; the inclination passes off, and it
hours before she has recovered strength to call again, but with this unv
result: the next day the call is made later, and later, and later, until
a while it is omitted for a whole day, and before the person is aware of it
found that the bowels are constipated—that several days pass without an
uation, and with this certain uncomfortable feelings are observed entirely
to the person in question; they are simply "symptoms," the indications
disease is setting up in the system, such as headache, cold feet, bad t
the mouth on getting up in the morning, an irregular appetite, qualmish
an absence of accustomed vivacity; and in due time there is actual
the shape of sick headache, sour stomach, piles, wasting diarrhœa, c
"the least thing in the world gives me a cold," dyspepsia, with all its h
or a general decline of the whole system. Every observant physician k
that more than half of all ordinary diseases have their foundations laid in a
constipated condition of the bowels—that is, a failure in them to act every day
with almost the regularity of the rising of the sun; and he further knows that
the beginning of this irregularity was brought about by deferring the calls of
nature until company was gone, until the chapter was finished, until the news-
paper was looked over, until some work in hand was completed, or until "
coast was clear." It is in this as in thousands of other cases that the gre
of calamities arises sometimes from almost inappreciable causes; and in all hu-
man record there is not a stronger exemplification of it than in the case
hand. There are thousands and tens of thousands of intelligent and observant
persons in mature life, and still later on in years, who would cheerfully give a
large portion of what they possess if they could have a natural, regular ac
of the bowels every day without any artificial aid, and who can and do l
back in vain remorse to the times when there was a proper and healthful reg-
ularity, and to the occasions and manner of their first breaking into it, simply
for the want of a little personal energy, a little self-denial, a small modicum
of force of will, which would resolutely, and even impatiently, clear out of its
path those trifling, those cobweb obstacles which were in the way of our physi-
cal duty, as it were. But it is not always that nature allows persons to escape
with a moderate or protracted or slow punishment. There are multitudes of
cases recorded where, from motives of false delicacy, as riding in public vehi-
cles, waiting for others, or for daybreak to come, or from sheer laziness, the
power to pass water has been taken away, acute inflammation has set in, and
death has followed in two or three days. It is well worth while, then, to say
all that has been said, if by it a single family should, in the erection of a new
house, or in the remodelling of an old one, be led to make a wise and practical
use of the facts which have been presented, in having a privy constructed with
two or three apartments, appropriated to the different classes of the family, so
that one may never need have to wait on another for a single instant, and also
that approaches may be made with as much privacy as practicable, and by a
path protected from the weather, to be used when inclement, and by another
to be used in good weather, and still as distant from the house as can be con-
veniently arranged; for example, to be approached through the wood-house
or perhaps through the garden. The deposits should be made in a water-tight
plank box, placed on the surface of the earth, on runners or wheels, to be re-
moved and emptied once a week, and buried in a compost heap. The fæces
of one individual will fertilize an acre of ground every year to an extent greater

than any ordinary compost. In addition, for the seven warmer months of the year, lime or fresh ashes of wood should be scattered around the receptacle every fortnight, while a gallon or two of the following solution should be thrown into the receptacle itself every week or two: one pound of copperas, known as "sulphate of iron," costing but a few cents, dissolved in four gallons of water, will most completely destroy all offensive odors, whether in sinks, privies, or cellars. The warmer the weather the oftener must the application be repeated. Sprinkling the copperas itself is advantageous, and, if in cellars, is one of the best means of keeping rats away.

One of the most sensible thoughts in this connexion, and one which could scarcely occur to any other than one of the members of the Society of Friends, so remarkable for their thoughtfulness and happy talent of having about them all the conveniences and appliances which so much add to the comforts and enjoyments of domestic life, was in having a privy connected with his barn, for the convenience of his gentlemen friends who visit him in the summer at his delightful mansion on the banks of the Hudson. This is one of the earliest pieces of information given to those coming for the first time. To this they can repair at any hour with a feeling of perfect privacy.

PIAZZAS.

There can be no good reason why a piazza, from eight to twelve feet broad, should not extend the whole front or end and part of the rear of every farm-house; and considering the personal advantages of such an arrangement, and the air of coolness and beauty and liveliness which they present in summer, it must be put down as a great oversight in that they are not more common than they are. It cannot be denied that they contribute greatly to the coolness of the lower rooms in warm weather, and afford facilities for play to the children in inclement or muddy weather, and for exercise to grown persons, which are of inestimable value in promoting health. It would surprise most persons greatly to know how many girls in the country have fixed diseases grafted in them before they leave their teens; this is most strikingly the case with the daughters of farmers who are "well off" and actually rich. This comes about largely from the fact that they have not the inducements of exercise half equal to similar classes in large towns and cities. They, perhaps, sweep a room, or dust the parlors, or make up a bed or two in the morning; and that is about all the exercise they take on foot during the day, except when they have visitors; the remainder of the time they sit and sew, or read, or loll about, not altogether because they do not want to exercise themselves, but because there are not the facilities of doing so in the way most agreeable to them. Few farmers have a spare horse suitable for a girl to ride, and if they did, she must have some one to ride with her; that requires a second horse, and the brother or father must accompany her. These circumstances narrow down the chances of horseback exercise, exclusive of church-going days, to about a dozen or two hours in a year to eleven farmers' daughters in a dozen. And however lined to walk, it is impracticable in winter, because they must step from the or-sill into mud, or slush, or snow. In summer it is too hot in the middle the day; in the morning the grass is bedewed; and so in the evening, un- it is early—say just before sundown—when it is not altogether safe to be of sight of the house. All these are deemed satisfactory excuses for ne- ct of a plain duty. If there were commodious piazzas, there would be ad- able facilities for walking at all seasons, and every day for games, rope- apii plays, and promenades of every description; and by reducing it to m, an amount of exercise in the open air could be taken every day, the of which upon the physical health, the mental power, and general vivacity ɔt be readily estimated.

In building a new house, or remodelling an old one, the upper ro chambers especially, when practicable—should be so arranged that the should shine into them as much as possible to give the light and dry cheerfulness which so much contribute to the healthfulness of a cha the lively, cheerful temper of those who occupy them. All farm-houses sh be arranged, as far as possible, so that the rooms which are most generally oc cupied should have most of the sun during the day. It is too often the that the parlor, the company room, is the largest, lightest, and best room in building; this parlor is barricaded with curtains, window shutters, and doors, except when there is "company," which will, perhaps, aver a dozen half days in the year; the remainder of the time all its sweetn

"Wasted in the desert air."

By all means let the best room in the house be enjoyed every day by members of the family; give the room which is largest and lightest to your own wife and children all the time, instead of saving it for other people for a dozen hours in the year. Besides, such a room, almost always closed up, is a positive injury to every person who enters it; for, in winter, it has a pernicious "closeness" about it, while in summer there is a mustiness and dampness, often a "chilliness," present, which makes it feel almost sepulchral the moment it is entered.

HOUSE-WALLS.

Wall-papers, like carpets, are the inventions of laziness and filth; they ceal dirt and noisomeness of every description. The milk-white floors and v plastered walls of olden time have almost entirely disappeared, to the gr detriment of family purity and personal health. It is greatly to be regret that this is the case to the extent that it is. White-plastered walls can be l clean for a number of years; the lime in them has the effect to purify th Next to this the painted wall, covered well with a suitable varnish; for it can be readily washed without injury, and is easily kept free of dust. In cases where walls must be papered, if for the first time, there are two important precautions: use no paper which has a green color, especially a "fuzzy green," which is composed of arsenic, and is capable of causing convulsions and fatal disease in a single night. Children have been taken extremely ill after playing a few hours in a small room covered with paper which had considerable green-colored patterns on it. Care should be taken that the paste should be fresh, and put on equally and thin, and that any holes in the wall should be filled up with plaster. A tidy room in a certain dwelling was appropriated to lodgers. It was noticed, after a time, that as certainly as a person slept in that room a single night, severe sickness next day was the result. The authorities ordered an investigation, when it was found that a depression in the wall had been filled up by one of the workmen by gathering up a bucketful of pieces of paper and some remnants of paste to make them adhere. After a time decomposition began to take place, giving out emanations of the most poisonous character; and for this reason, if any wall of plaster or of wooden partition is to be papered or repapered it should be thoroughly cleaned first, then made smooth; every particle of old paper should be removed.

The way in which the smallest amount of money can be made to go farthest on a farm, morally and pecuniarily, is by investing it in lime and white lead. Filth, dirt, darkness, and untidiness, always and inevitably degrade those who dwell among them. Cleanliness purifies and elevates. If white-wash is used, it should be applied every year to whatever is exposed to wind and weather; that which is, perhaps, the cheapest, most durable, and most generally available, is made thus: one ounce of white vitriol—that is, sulphate of zinc—and three ounces of common salt to every four pounds of fresh lime, which is lime not

len into any powder from exposure to the atmosphere, with water e
ke it sufficiently thin to be applied with a brush; this makes a dur
or whitewash. When white paint is used, two precautions are ne
obtain a good article of white lead from a dealer whom you kn
. There is, perhaps, not one pound of pure white lead in a mil
sold for pure white lead, as there is a substance called barytes whic
chased by the ton for, perhaps, less than a cent a pound, which, wh
h white lead, cannot be distinguished until some time after it is spre
it becomes dark. When it is remembered that white lead sells for ten
much per pound, the temptation to adulterate is too strong for the hc
any white lead manufacturer known to the writer. The proportio
adulteration is from ten to ninety per cent. Zinc paint is used espe
inside work, and makes a beautiful glossy white finish; second, the
tive power of white paint depends, in considerable measure, on the time
If in hot weather, the water of the oil evaporates so quickly that the pa
is not carried into the wood, and remains as a powder on the surface,
be wiped off with the fingers. If in the inclement weather of winter,
to be washed off by the rains before it has sufficiently dried. The a
best, when the ground is not likely to be dusty, and when the weathe
enough dry to allow the paint to get thoroughly dry itself. Out-do
work should be painted once in every three years, if white, but color
last much longer; nor is white the most desirable color for a farm-ho
tuations, and if done as just proposed, it not only preserves the bui
beyond the cost of its application, but it gives an air of thrift and life an
of which almost every reader has had personal experience. And in
wishing to sell a farm thus kept painted and whitewashed, as to its fe
buildings, a better price can always be had, and from a better and more
class of purchasers.

ICE-HOUSES

are beginning to be considered indispensable appendages to a farmer
and, indeed, to every man who owns his premises. They are not
sity, and where there is a good spring, or never-failing well, they ca
pensed with, especially as they do not contribute to the general healt
family, unless the use of ice is wisely controlled. The free use of
tends to the decay of teeth prematurely, is liable to produce dangerou
mations of the stomach, and certainly is the immediate cause of dysp
eases in multitudes of cases where it is freely indulged in at the regu
of the day. At the same time, as many will prefer building ice-hou
proper here to give some directions in reference to the subject.

That ice keeps better ordinarily above ground than below, and tha
tion is necessary in order to its well-keeping, are two indisputable fac
more compact the ice is, the longer will it keep; hence plans have bee
of letting a stream of water run slowly into the ice-house after it has b
so that all the crevices may be filled up; or, where a running stream
able, some persons have arranged to let the water in a foot deep du
cold weather; when this has frozen solid, let in a few inches more
house is entirely filled; or, it can be done with less trouble and att
during very severe weather the water is conveyed into the ice-house d
night, by or from a running stream, in a very fine spray, freezing as
There should be a double roof; the under part of the rafters should b
closely, and between that and the shingles a space of eight or ten i
more, should be filled up with saw-dust, spent tan-bark, or other po
stances. There should be a space between the straw on the surface o
and the roof for purpose of ventilation, to prevent the air from becom
and close, with a wooden chimney of eight or ten inches square pie

roof; or a sliding panel in the door would answer; the ventilation
a current of air. If the eaves of the roof extend a foot or two over
greater protection is afforded against rain and the rays of the sun.
of an ice-house should be steep. Great care should be taken against l
of this, as well as of all other farm buildings. A cement may be applie
a trowel or case-knife to all leaks in roofs, or about chimneys, &c., made t
Take pure white lead and mix it with boiled oil until it is of the thick
thin paint, add to this common sand until of the thickness of common
there is, perhaps, nothing better than this. A space twelve feet in the
every direction will hold enough ice for a large family.

Ice-houses should be located, as a general rule, on the north side of a
built under ground, so that the ice can be approached on a level with the gr
on which it is built. On many farms such a location is impracticable,
only alternative is to build one on the surface, which is now, on the wh
sidered the most approved way. The general construction should be a wo
frame building, with another outside of it, with a space intervening
fifteen to thirty inches, which should be filled in with coal-cinders, tan
which is better than either, pulverized charcoal. It would be better if the
building were made of solid timbers close together, and about three inch
the outer one, or the shell, may be a common frame, neatly weather-b
and kept well painted with white lead, so as to repel the heat of the
will add to the convenience of an ice-house if the bottom, or at least a
it, is arched, so as to form a place for a larder under this arch, or the dr
of the ice should be made to pass through the dairy or "spring-house."

The following extract, from Moore's Rural New Yorker, shows how a fa
may build an ice-house cheaply. This has been built ten years, and is perfectly
sound except the inside boarding, which requires renewing once in five or six
years:

"The size is eight by ten outside, six feet high. I took two-inch plank, twelve inches wide, for sills and plates, halved together at the corners. I used studs on the inside, and boarded up and down outside. The cracks should be covered with battens to prevent the air striking the ice. The inside should be boarded the other way, to within a foot or so of the plates, which should be left until the space is filled. The rafters should be five or six-inch stuff, boarded on the inside, and the space filled with either sawdust or refuse tan bark. I place poles or scantling in the bottom, and cover with slabs, which will afford all the drainage necessary. The door should always be on the north side. The cracks in the north gable-end should be left open for the purpose of ventilation. I consider sawdust the best to fill the sides with, but tan-bark, turner's shavings, chaff, or straw, will do. The size of this house may be objected to by some, but mine holds enough for a large family, and also a dairy of twenty cows. I don't believe any dairyman who has had ice to use one year would be without it for ten times the cost.

One thing more about the house: It should be banked up at the bottom, for any circulation of air through the ice will melt it as fast as water poured through it."

Many farms have small streams of water running through them. In such cases the locality for an ice-house should be selected with reference to the convenience of damming this stream near it, before Christmas, in such a way that a lake of a hundred feet or more in diameter, and about two feet deep, may be formed, and properly protected from cattle and all nuisances. This body of water would yield enough ice for a large farm, and by its shallowness would be more certain to yield a crop of ice, because a less degree of cold would be required to freeze it solidly than in a deeper stream, or one which was running, even with a sluggish current. One freezing over would yield thirty or forty one-horse loads of this summer luxury. While the lavish use of ice and ice-water cannot be prejudicial to the health of any family, common ice is one of the most valuable of remedial means in case of sickness in various forms.

To a person burning up with internal fevers ice is a comfort beyond expression. Swallowing ice freely in small lumps is the chief treatment in inflammation of the stomach. The constant application of ice pounded fine and en-

ɜ the head with it by means of a cushion or other contrivance is the liable remedy for that dangerous malady, inflammation of the brain, ıo often sends its victim to the grave in a few days, or to that living he mad-house.

l inflammations, whether internal or external, ice diminishes rapidly the the blood-vessels, and thus relieves the pain they give when thus swol- heir pressing against the nerves, which are always in the neighborhood rteries of the system.

ıeria and some of the worst of other forms of sore throat have been ar- ı a very short time by pounding a piece of ice in a bag, then laying the ıck, take the lumps of ice and swallowing them continuously until re- llowing them to be detained in the throat as long as possible, there to

l forms of diarrhœa and dysentery, where there is great thirst, the tion of which by drinking any liquid increases the malady, they are y controlled, and in many cases perfectly cured, by simply swallowing lumps of ice as possible.

psy itself, one of the most uncontrollable of human maladies, is said to ed successfully in London by the application of ice to the spinal por- he system.

ɜce of ice laid on the wrist will often arrest profuse and dangerous ; of the nose.

ɔup, water as cold as ice can make it, if applied freely and persistently hroat, neck, and upper part of the chest with a sponge or cloth, often ın almost miraculous relief, especially if followed by drinking copiously ɜater, wiping the wetted parts perfectly dry, then wrapping the child up in dry flannels, allowing it to fall into a delightful and life-giving

ɔ statements may induce the farmer to be at pains, if he does conclude an ice-house, to have it done in the most thorough manner, and after ɜ approved pattern.

SHADE TREES.

ks well in the midst of summer to see a tidy farm-house almost hidden ɜw by trees and bushes; but the influence they have in keeping a ; damp in summer, and in producing a raw and chilly atmosphere in ɜhus engendering disease the year round, are sufficient reasons for ex- a wise discretion in this direction. Persons who have visited England en admired the country-places of the gentry, one very uniform attendant beautiful green lawn in front of the buildings, not a single bush or tree, ; may be in a diagonal direction from the front corners of the buildings, and away. It would subserve the purposes of health, especially in low, or damp localities, to have neither tree nor bush within twenty or ɜet of the front of the farm-house, unless it be a flowering plant here e, or some stately and ancient denizen of the forest, to give an air of r and substantialness to the surroundings; but even these should not ɜar as to keep the roof of the building always more or less damp, nor ın the best and most frequented rooms of the house; for the first, the lispensable requisite in building or remodelling a farm-house should ange for its healthfulness.

BARNS.

should be erected in as dry a locality as possible, where the sun can ⁻n them the whole day, and where the ground descends in every Special attention should be paid to the roofing, so that the rain

may be turned off rapidly, and that the snow may melt very so possibility of large accumulations.

THE STABLE

should be arranged to be above ground, to be well ventilated, and to abundant light; in short, to be cool in summer and warm in winter. never be a successful farmer who does not shelter his cattle effec well in all seasons from the inclemencies of the weather. It is not manity, but a great pecuniary saving on every farm where there is a living animal. Some build stables low for warmth, but the advant than lost by the vitiation of the atmosphere. A warm bad air is v the cooler and still atmosphere of a stable. The ceiling of a stable at least ten feet high, with an apertnre for the escape of foul air; the or partitions should be close, and arranged to have abundant li through glass windows. In summer the sash may be removed.

The American Agriculturist for December, 1863, gives a descri stable for draught and farm horses which contains the most impor on this subject, though, perhaps, not practicable for farms generally:

"The stable should not be less than eighteen feet wide, and of such length as wil six feet standing for each horse. It should be ten feet high. The horses stand in a row, and the harness is hung on pegs in the wall behind them. This width thorough ventilation to the stable without subjecting the horses to draughts. Each should be parted off by an upright post reaching from the ground to the ceiling raft three feet from the wall at the horse's head. The partitions should be closely bo three feet above the manger and hay-crib to prevent the horses quarrelling about the biting each other. To each of the posts a bale, eight feet long and twenty inches should be hung by a strong chain to divide the standings and suspended by another chain at the hinder end from the ceiling rafter. Each chain should have a hook within reach that may be readily unfastened. This arrangement will leave a space feet opposite the head of each horse available for feeding purposes. The manger for c chaff (cut feed) may be two and a half feet long. It should be two feet wide at the to foot two inches at the bottom. The hay and straw, which should be cut into six-inch l will require a larger receptacle, which should be three feet six inches long, two feet t its upper part and half that width below. It should be so constructed that while it is even with the manger above, it should reach to the ground, two feet above which should be to the wall a bottom, sloping to one foot above the ground in front, where some upright ings should be cut to allow the escape of seeds and dirt. At the top of this hay and crib, an iron rack with bars six inches apart, should be so hung as to open up and fal against the wall to let the fodder be put in, and then be put down upon it for the horse through. It should be so much smaller than the opening that it can fall down with the der as it is consumed, by which means not a particle is wasted. The manger may be structed of yellow deal one and a half inches thick for the front, back, and ends; the b of slate, three-quarters of an inch thick. The top of the front and ends should be e with half round iron, two and a half inches wide, screwed on to project over the f quarter of an inch outside and three-quarters of an inch inside the manger. This p the food being tossed out and the manger being gnawed. A short post must be pu near the centre of the standing as possible to support the manger, into which a large ring must be put to let the chain or rope of the headstall pass freely up and down v constant friction. The manger may be three and a half feet from ground to top; the crib of course the same height. The paving of the standings to three and a half feet the head, should be flat, then with a fall from both sides to the centre, where an ar drain of four inches wide from end to end, with a removable flat iron cover fitte inside of it, should be placed straight down the standing, with a fall into another larger cast main drain ten feet six inches from the head, so placed as to carry away the urine from all the smaller drains into a tank outside the stable. This main drain so placed, takes the urine from the mares, and has a loose cover also fitted to it, easily removed for sweeping out when necessary, perhaps once a week. This system keeps the stable healthy, economizes the urine and the straw also, the latter very important where it can be sold, or consumed as feed. The width of eighteen feet for the stable gives room for narrow corn bins three feet high, so that each carter may have his horse's corn separate."

In the above, paving has been alluded to for standings, but a hard, dry dirt floor is greatly better than stone or plank. A nice, smooth, hard, and dry floor may be secured with small stones packed like a McAdamized road, the inter-

g filled up with good cement, or with the dust made by breaking up rock. This will make a floor which water cannot penetrate nor disturb. The cheapest and best bedding, at least near mills, for r, or for any other if kept dry, is saw-dust, which should be laid in when dry, in the fall of the year.

be added that a good farmer and a generous man, having arranged or the comfort, health, and happiness of his family and the elevation es of his neighborhood, will not rest satisfied as long as the noble useful cow, and the patient ox and mule are without comfortable arm in winter, cool in summer, and all the year round abundantly indly treated, extending these with a right good will to pigs and).

FARMERS' GARDENS.

BY HON. SIMON BROWN, CONCORD, MASSACHUSETTS.

vegetable garden is conceded by most farmers to be both convenient ble, and yet comparatively few farmers have one. The reason usu- for the neglect is that they do not have time to attend to it. The e case is that the garden requires a little care daily, and demands atience, and system, in order to secure success and profit. Unhap- are just what most farmers dislike, preferring to tend the larger e less thought and more muscular power are required. They would the rich products of the garden upon their tables, and the pleasure, profit they would yield to the family, but the habit of neglect in lar has become so deeply implanted that no common influence will

knowledge that half an acre, or even less, devoted to garden cul- annually produce more profit than four or five times as much land he other crops of the farm, thousands of our farmers still remain kitchen garden even that is worthy of the name. It would seem ary interests, and a regard for the health and comfort of the family, come the dislike to cultivate a garden; but the aversion to systematic les all these considerations, and the garden remains only in antici- a some out of the way place, consisting of a few rows of potatoes, beets, and a sage root or two, with a swamp of weeds, whose only feature is, at the end of the season, the presence of winter birds in daily meal of seeds.

a garden the winter diet of the family must be mainly confined to , and potatoes. When warm weather returns, the system requires ting food, and demands cooling and juicy vegetables, fresh from the any farmers have no garden—not even an apology for one. I knew e the wife of a farmer worth ten thousand dollars went to a neigh- n to beg a few fresh vegetables when company was expected. of farmers' tables are rarely graced with early vegetables, such as es, early beans, potatoes, and peas, when they might be crowned luxuries peculiar to each season by a little labor and systematic

An observing gentleman from another State, in writing to me on this subject says: "No part of the farm pays as well as the kitchen garden, if well take care of. I do not mean by this that every farmer can make money by vegetables for market, because that is impracticable; but it is a fact that a farmer must procure the support of his family from his farm well-conducted garden will produce more towards this than any other part the farm of five times the extent."

It is said by medical men that vegetables and fruits as diet are conducive health, and as most people, and especially children, are fond of garden it is policy for every farmer to provide a plentiful supply for home co It would seem that people possessing all the conveniences that farm regards land and leisure to take care of a garden, would consume the amount of vegetable food, but the truth is that more is used by the people cities and villages than by the same number of land owners. Take a among the farmers and it will be found that one-half of them have no at all, or at most, a little corner in a grain field, which is half overrun with weeds. Others have a place set apart for the purpose, but do not find time to do anything in it until all the spring farm-work is done, thereby making it too late to secure any of the vegetables requiring early planting. This is a loss when we take into consideration that such things are relished m in the hot weather of June and July than later in the season. What aggravating than to know that one's neighbor has green peas, new potatoes, s beans, and the like, and his own but just up, and all through his own neg in not planting in season? And the farmers' wives and daughters also feel effect of this neglect when, during the first two or three summer months, t have to rack their brains to think what to get for dinner; for when the weary with labor, come in from the fields their stomachs are apt to re against salt pork and old potatoes. But if there are early potatoes, peas, and other vegetables in the garden, there is no trouble in getting up a di that the men can eat with a relish; and few things are more gratifying to the farmful housewife than to see her husband enjoy the food she has prepared for him.

The garden should be near the house, as housekeepers do not always have time to go far; and if it is near by, a great many leisure moments can be spent in weeding and taking care of it. It should also be so enclosed that neither fowls nor stock can enter it. No success can reasonably be expected if fowls are allowed to range in a garden, as their instincts lead them to the freshly-moved soil for some of their most essential food. They are, therefore, always ready to scratch where the gardener has just fashioned his new beds, planted his choice shrubs, or scattered his early seeds. If enclosed, the space alongside the fences may be occupied by raspberries, blackberries, tomatoes, and other climbers, which will serve the double purpose of affording fruit and providing a shelter for more tender plants. If a path runs between these and the more central portions of the garden, these climbers can be conveniently cultivated from it, and their spreading be very easily prevented.

The manure for the garden should be well rotted, and if allowed to remain in a vault or cellar through the summer, all seeds would be killed, thus saving a vast amount of work in weeding. Apply the manure in the fall and plough in immediately, ploughing again in the spring, which thoroughly mixes it with the soil. As soon as the weather will permit, plant early potatoes, peas, and all kinds of early vegetables which are not liable to be killed by frost. Put in others along as the season advances, and when they come up, keep them well hoed and free from weeds, and you will enjoy the satisfaction of having something good as well as your neighbor.

LOCATION OF THE GARDEN.

Every man should do his best to own a home. The first money he can spare ought to be invested in a dwelling where his family can live permanently.

something agreeable to our better nature in having a home that we can
wn. It is a form of property that is more than property; it speaks
irt, enlists the sentiments, and ennobles the possessor. The associa-
spring up around it as the birthplace of children, as the scene of life's
iotions, as a sanctuary where the spirit cherishes its purest thoughts,
rove and exalt the moral sensibilities. Our happiness of to-day is
by a view of the place where we were happy yesterday. The scenes
nstances by which we are surrounded have much to do, not only with
:ter, but with our happiness. On this account we should do all in our
make our homes attractive; to adorn them with those charms which
e and refinement so easily impart to them. It costs little to surround
with those simple beauties that delight the eye far more than ex-
jects. Nature delights in beauty; she loves to brighten the land-
make it agreeable to the eye; she hangs the ivy around the ruin,
he stump of the withered tree twines the graceful vine. Beauty is a
rumentality; it is one of God's chosen forms of power. He who
appreciate and enjoy the beauties of nature, loses one of the most
ifts of his being.

there are few things that mark the progress of civilization and the
than a correct taste in architecture and gardening. So long as men
rent to the appearance of the house they live in, and the grounds that
it, they will rarely exhibit a true taste in anything else. We are
he belief that our farmers are gradually improving in this respect.
;ence and wealth increase, so do refinement and good taste. During
mble in the western part of Massachusetts, I found much to strengthen

The houses are of a better class, well finished and painted; the
:er; smooth and velvety lawns, instead of door-yards filled with rub-
le trees around the houses and along the highways; land set apart
purposes, into which a few hardy shrubs are introduced, with small
ıragus, and other esculents; and a variety of apples, coming into use
to July. The garden on the farm was one evidence of the happy
at have taken place, and was observable all along my route.

eerful influences of better buildings and productive gardens have
a taste for the cultivation of flowers,

> "Whose voiceless lips are living preachers,
> Each cup a pulpit, and each leaf a book."

scarcely a farm-house now but has its flowers. They give a pleasant
ul aspect to the homestead, and attract the grateful admiration of the
veller. Their almost universal cultivation indicates a refined taste
intellectual attainments. Such evidences of improvement are full
for the future. The thriving occupants of residences in the vicinity
arge towns and cities are doing much by their example to stimulate
s in this direction. The creations of beauty which wealth and taste
ıced, attract their attention, awaken in them the love of the beautiful,
ıem to attempt their reproduction on a cheaper and simpler scale.

den should conform in style and character to the homestead and its
gs. It should be in the immediate vicinity of the house, so that it
dily accessible, and under the constant supervision of the household.
ı of it is devoted to the culture of flowers, that should, if possible, be
that the passing neighbor and stranger may enjoy its beauty and

Flowers are like sunlight and pure breezes—we enjoy them none
cause others enjoy them too. A good garden needs a variety of
it can be so managed that it will embrace a high and dry soil, and
is lower and more moist, it will be an advantage. Early vegetables,
peas, beans, and early potatoes need a warm, dry location. Those
later in the season, as strawberries, pears, and some other plants,

thrive best in a more moist soil. A situation on a southerly slope, if the s very slight, near the foot of a knoll or moderate elevation, is desirable. The m may be worked into terraces, or cultivated on its natural inclination. Such location affords a shelter which most garden vegetables require in their early and tender stage.

When situated near the house the garden will be more frequently v by the women and children of the family, and they will become more in its products and cultivation. There should always be a dry and v walk from the house to the garden, and, if practicable, this walk s u bordered by shrubs and flowers, so as to tempt the feet of visitors rel u the inmates of the house. Such a path is not one of those flowery ones lead the young astray, but, like the "straight and narrow way," it le virtue and peace, and should be made, in every respect, as inviting as pc As farm buildings are usually erected without reference to a garden, it always be located in the most desirable situation.

PROPER SOIL FOR THE GARDEN.

The best location that circumstances will permit having been se l next step will be to get such a soil as will best suit a majority of the pl ve wish to cultivate. It is a mistake to suppose that some specific soil is pensable to success. There is probably no farm in the country that does afford a spot near its buildings which, by skilful management, may be produce all the varieties of fruits and vegetables adapted to the cl ; there is a diversity in them, and if we do not find such as we desire pre by nature, we must resort to art. Soils perform at least three grand f in reference to vegetation. They serve as a basis on which plants may an their roots, and sustain themselves in their erect position; they supply food vegetables at every period of their growth, and they are the media in v many chemical changes take place that are essential to a right prepara n the various kinds of food destined for the growing plant.

The character of the soil, by which I mean its capacity to afford a h tion to the plant appropriate to it, and at the same time to afford the re ea aliment, as all gardeners must see, is of the first importance.

First, it should be such as to afford sufficient moisture to the roots, and to admit the air to penetrate it freely. The soil consists of decayed veg matter, mixed with particles of rock reduced to fineness by the action of atmosphere and of water, and sometimes by the roots of plants. It is u s- sary to describe the different kinds of soils in regard to adaptation to supply moisture.

Secondly, it should afford a supply of carbonic acid. This is furnished by the decay of vegetable matter, or by absorption from the atmosphere. This faculty of absorption is assisted by mixing with it charcoal, muck, or other matters having great absorbing power. Charcoal consists chiefly of carbon: and it has been found that plants will grow more luxuriantly in soil containing a large proportion of carbonaceous matter, if well supplied with water, than in any other soil. Charcoal is not only a medium of absorption, but when water is present it is decomposed, and its oxygen combining with the carbon of the charcoal, carbonic acid is furnished to the vessels of the plant.

Thirdly, the soil should be capable of furnishing a supply of ammonia to the roots. This is also much assisted by the presence of gypsum or charcoal, which absorb it from the atmosphere. The usual mode of supplying it is by the addition of animal matter from the stable. Ammonia imparts its nitrogen to the plant, and it is to this that much of the nutritive value of the cereal grains and many esculent vegetables is due.

Fourth, it should contain those mineral ingredients which are the growth of plants. These, if wanting, must be supplied. The

s is by mixture of other soils, as will be presently stated. This is geously resorted to when the soil is too little or too much retentive in consequence of being too loose, or sandy, or calcareous, or too stiff. This is called tempering the soil. When the soil is too rous, or too stiff, the mixture of the opposite kind in just proporing it to a more suitable condition. In this way a body is given ls that are too porous, and those which are too heavy and tenade more light and loose. This process brings no nutriment to the y, but only mediately by attaining a retentive power in the right thus furnishing nutriment by a proper supply of water; and it also y on the health and quality of plants.

ly gravelly or sandy soil is unsuitable for garden purposes. So is soil. Such a soil would be wet in its natural state, and a wet one. But all these may be so altered and attempered by drainage tion of materials as to make a sandy loam that will meet all the mmon plants. Moist, heavy soils that rest upon clayey subsoils dapted to pasturage, mowing fields, and the production of trees, be made suitable for a vegetable garden by thorough draining, trenching or deep ploughing, and the intermixture of sand and hout these helps such land is too wet in rainy seasons, and is me hard upon the surface during dry seasons, and in either case le for the free growth of plants. But by the removal of the water properties of the soil are in a remarkable degree improved. "Dry easily reduced to a fine powder, but it naturally runs together is poured upon it. So it is with clays in the field. When wet e, compact, and adhesive, and exclude the air from the roots of plant. But remove the water and they gradually contract and y direction, become open, friable, and mellow, and are more easily worked, and pervious to the air in every direction." Thorough n, and the intermixture of sand, and coarse and warming dressings se stables, will bring a heavy soil into a condition favorable to the ıy plant.

ns are made up entirely of sandy, plain lands upon which there is different character. When such a soil is highly cultivated it will ı early vegetables to perfection, but fails to mature crops that ger growth. It may be amended, however, by a mixture of clay These should be hauled in and spread upon it in the autumn or ıat frosts and rains may pulverize and sweeten them; then by nd by other means they should be thoroughly mingled with the s way, and with suitable manuring, a sandy loam may be formed, best soil for all garden purposes. But it may be necessary to sandy soil. If springs rise to the surface, as they frequently do, ained. In many sandy soils water is obtained in wells by digging ten feet, because the sand rests upon a hard or clayey bottom. s draining is indispensable to success. The action of manures on soil increases its cohesibility, its capacity for absorbing and reure, and renders it more compressible. Applied in sufficient enders the soil unctuous or pasty, and less likely to be affected by spheric alternations of wet and dry. It also forms a better medium s of vegetables, which, in a light and excessively porous soil, do l with sufficient firmness.

ı of a cultivated soil is always a matter of importance. Lands on egetable stratum is thin are deficient in permanent productive equire much more manure and more thorough working than those epth. Digging two spits deep, as is the practice in Europe, or ing deeper with the plough, tends to improve such soil, and will

eventually render it productive, if the requisite care can be exercised i ping and manuring.

When the upper stratum is thin and reposing on a poor subsoil, a change may be effected in the following manner, although, on accoun great cost of labor in this country, it may not be advisable to attempt it on a limited scale: Along the margin of the piece to be improved soil, subsoil, sods and all, into a winrow on one side to the depth c twelve or twenty-four inches. Then commence on the side in the c the improvement is to proceed, and deposit all the mould and sods tak the top in the bottom of the first trench, throwing that taken from th of the second trench over on the top of the first, and in this manner till the work is done Then cart on old, well-decomposed compost, mi an equal volume of green, unfermented stable manure, and work th thoroughly into the yellow earth until the virgin soil is approached. allowance of manure is required in order to hasten the decomposit soluble silicates contained in the fresh earth, as well as to insure r ready absorption of the fertilizing gases from the atmosphere, which sary to impart vigor and activity to its latent powers. A small qu fresh manure, sprinkled in as the filling goes on, will be of great servi indeed, any kind of vegetable matter, such as straw, forest leaves manure, will materially assist the process of enriching the land, furnish food for the plants. Lands treated in this manner stand the much better than untrenched grounds, and are always found to be ductive, with the same amount of manure, than the deepest soils natural and unworked state.

In gardens I have seen this tried repeatedly. It is well known t and coarse gravel taken from wells and cellars will, when exposed f pheric influences, imbibe principles of fertility rapidly, where no n used, and become in a short time covered with verdure. I have kn common yellow sandy loam taken from the pit and spread on upland fields with the best results. This loam is full of fertilizing salts, wh being brought to the surface, under the influence of the air and r imparted to the roots of grasses with surprising effect.

Plaster and charcoal, each, are powerful absorbents of enriching g from the air, and in all experiments like the one I have suggested the profitably employed. The second year after digging a very marked ment will be apparent, and a single operation will have a decided infl many years.

Those who have but little land should attend to this suggestion if t to make a garden productive. I have done it on garden lands, accomp thorough draining, and think I have doubled the crop, using no mor than I did before the trenching.

When a soil is brought into the genial and healthful condition I tempted to describe, it has a vital action energizing every portion of i really breathes as animals do. An ingenious and philosophical writer

"A few years since if one had asserted that trees had lungs and breathed, he w been held to an argument to prove it, just as a few years earlier nobody would hav that the gills of a fish, the leaves of a tree, and the lungs of an animal, all perf same office—that of aërating or airing the blood or sap. The soil breathes. H breathe! Its circulating fluid (the blood of the soil) is water. This comes from t is already aërated—that is, filled with air. It soon loses its gases by contact wit just as the arterial blood fresh from the lungs loses its oxygen when passing its all parts of the body. The blood comes back to the lungs for more oxygen; bu of the soil cannot do this, so we must let the air in, to come in contact with it."

From this exposition of nature's workings the gardener will see th sity for "stirring the soil as deeply as practicable during drought, wi terfering with the roots of growing plants, so that a deep and light

e circulation of air beneath the surface. Hot air the moment it ath the surface becomes very moist, owing to the condensation of ; contains, and which it deposits, thus not only airing the soil but s moisture. Cold air holds but little moisture, while hot air dis- mmense quantity which it deposits when it cools, or on cool sur- o has not noticed on a winter day a locomotive leaving behind it ud of vapor like a comet's tail, often floating for a minute after the ssed? Think of this, and watch the steam car on days when the just as full of water as in winter, is puffed out into the eye of the t steam enough shows to make a shadow, it is so quickly absorbed

neral remarks will suggest to any observing and reflecting person y secure at small cost a garden plot that will give him scope aise all the fruits and vegetables needed by a family for its own l require some labor and thought and care; but so does the plough- ields, the building of his house, or the selling of his merchandise. ce brought into condition and followed by generous dressings and e, may be heavily cropped for generations without having its fer- ed.

SHELTER FOR GARDENS.

is desirable to raise early vegetables and the finer fruits shelter is at matter in most of the northern States, and one that is less at- an it should be. Under the head of "Location," I referred to the ded by the form of the ground.

garden lies upon a gentle inclination to the south, if the ground cupied by an orchard, or by forest trees, and especially by ever- e other shelter is needed. But such situations cannot always be Where the garden is on level ground, fences of boards or stone e shelters most commonly resorted to; but there are objections to the grounds around the home into small enclosures. It detracts their beauty, and the constant opening and shutting of gates and ded with much inconvenience.

white pine, hemlock, arbor vitæ, or Norway spruce, planted in iple rows on the northerly and easterly sides of gardens, furnish a ction than walls or fences, and at the same time add much to the he ground. Where early vegetables and the finer fruits are to be shelter is absolutely necessary. Vines and the more delicate pears greatly injured, and even ruined, by rain-storms accompanied by inds. A fence five or six feet high, or an evergreen hedge will ve them. Under such a shelter beds for early vegetables may be nd next to them the more tender varieties of pears may be planted. ations the ground will not freeze as deeply in winter, and will be to be worked several days earlier than open ground. The climate odified in places thus protected, and is actually found to be several rmer on cold and windy days than in unsheltered situations.

he most remarkable instances of amelioration of climate by artificial found in the garden of Mr. Tudor, of Nahant. This is a rocky projecting from the coast of Lynn into Massachusetts bay. It ielly of rocky ledges, and is not more than half a mile wide. It is the full sweep of the easterly winds, which bring the salt spray hole surface. The soil is thin, and with such fierce visitations of alt water, the vegetation is meagre and only of the hardiest kind. a situation science and labor have triumphed over natural obstacles, the almost barren rocks to blossom as the rose. Corn and waving of various climes, fruits, flowers, shrubbery, and rich lawns now ye where only desolation held sway but a few years ago.

Mr. Tudor found that trees, even those of a hardy character, would not grow, or scarcely live, swept and twisted by the winds and coated by the salt spray, and he set himself at work to ameliorate the climate. Cold winds sur with acrid salts must be kept out, while warm sunshine and gentle airs be admitted; and he has so far changed the climate of the locality as to enable him to rear tender plants and to produce fruits scarcely attainable in spots in the interior. Around one garden he has erected fences from twenty feet high of common laths nailed to strong cross pieces, leaving inte about two inches wide between them. Around another garden the fe brick, the lower five or six feet being built close and the upper port holes about two inches square. These fences so break and sift the wi deprive them of all power of either straining the trees or conveying spray to their foliage. The temperature is so changed that several difference may be noticed between the inside and outside of the encl a cold day there is a genial, soft atmosphere in the garden, while out of it November winds may howl along the coast with icy breath. With this of temperature Mr. Tudor has succeeded in clothing this part of the pro with rich varieties of plants. I here saw pear trees only four years from transplanting loaded with fruit. The Northern Spy fruited in perfection; also the new, tender raspberries, and nearly all the fruits found in our best gardens. Mr. Tudor has set ten thousand trees among the rocks on the handful of earth he could come at where he desired to plant, so that now the currents of wind being broken, and evaporation in a measure retarded, vegetation will spring up spontaneously, and trees of a less hardy character than those commenced with will succeed.

His example exerts a wide influence. Other cultivators take the hint from his operations, and by means of fences and shrubbery are enabled to accomplish what would otherwise be impossible.

I have seen on Cape Ann a granite wall fifteen feet high, erected by the owner of a quarry, for the purpose of protecting his garden from the east winds.

The market gardeners in Belmont, West Cambridge, and other towns in the vicinity of Boston, erect tight board fences on the northern and eastern sides of their grounds, and against these they make long ranges of hot-beds covered with glass or with straw matting. Here with the aid of horse manure from the city stables, they raise lettuce, radishes, early cabbages, turnips, beets, cucumbers, and tomatoes, and large numbers of these plants, which, at the proper season, are either transplanted into their own fields or sold to gentlemen in the vicinity. Indeed quite a profitable trade has recently sprung up between the gardeners and people from the country, who resort to them for early plants for their own gardens. Proofs of the benefit of shelter to gardens meet us on every hand.

There are few good grapes that will ripen in New England in unsheltered grounds, but protected by a wall or hedge many fine grapes will attain perfection. One of the finest nurseries within my knowledge is protected by a thick belt of forest trees, and here the choicest pears, which will rarely pay for cultivation in unsheltered places, yield their fruit in perfection. Shelter will do more towards securing the early maturity of fruits, so that they may escape autumnal frosts, than can be done by high culture and heavy manuring. These, in grapes and pears, will produce a luxuriant growth of wood and large, plump fruit; but the wood is so filled with sap that the maturing of the fruit is rather retarded than hastened. For ripening fruit the atmosphere needs to be cultivated rather than the soil, and this can only be done by shelter, which protects the fruits from searching winds and surrounds them with a warmer and more uniform temperature.

We formerly attempted to force early maturity by high culture, but experience has proved its futility. In climates where the season is long it will

ve fine fruits, but will not ensure that early maturity which is the great sideratum in the northern States, especially in regard to those fruits and its that have come to us from countries of warmer climates and longer ons.

HOT-BEDS FOR FARMERS' GARDENS.

Market gardeners, commercial florists and amateurs understand well the solute necessity of hot-beds in the economy of their operations. But few rmers are willing or able to incur the expense and afford the time which they agine necessary for their construction and management. Various plans have en suggested for making cheap and simple hot-beds, almost any of which ill answer for a garden for a common family. Every farmer may have at ifling cost a few feet square covered with glass to bring forward at least some ttuce, tomatoes, cabbages, early cucumbers, and a few flowers for his wife and ghters. October is the proper time to prepare the hot-bed.

Sashes three feet wide by five or six feet in length are the most convenient. Three such sashes will cover a bed of sufficient size for most families.

A frame nine feet long and of a width corresponding to the length of the sh may be made of plank or inch boards; it should be twelve inches deep t the front and eighteen inches at the back, the bed should be prepared on ie southerly side of a wall, board fence, hedge, or some building; dig out a pace as large as the frame eighteen inches deep; fill up with horse manure in- rmixed with leaves, straw, or litter of any kind one foot deep; tread it down oderately; cover this with good garden soil mixed with a little ashes, plaster, nd fine compost; put on the frame, bank up the outside with coarse manure, traw or mulch of any kind, and cover with boards: put on the glass in March, l let it remain until the bed has become warmed by fermentation; the glass uld be covered at night to prevent the radiation of the heat.

When the soil, which should be at least six inches deep, is in a proper state, w the seed in rows at suitable distances; a portion of the bed may be re- rved for pots, which should be imbedded in the soil to their rims. When the eds begin to sprout sprinkle the surface occasionally with the watering pot; the middle of pleasant days slide off the glass to give them air. It is im- rtant to attend to this, as growing plants need a plentiful supply of fresh air. fter the plants are well above the surface the sash should be lifted whenever sun is shining clear and warm, lest they be scorched. Sometimes a few urs' neglect of this precaution will greatly injure or entirely ruin the plants. The fermenting manure will keep the soil warm at the bottom and the sun ill warm the surface; thus the germinating seeds will find a warm soil and a arm air which will bring them forward two or three weeks earlier than they ould come in the open air. In this way strong and vigorous plants may be own and ready to transplant about the time seeds are usually sown in garden eds. After transplanting use some slight cover to protect the plants from the old night air and the wind, and, if needful, from black flies and other insects. Thus a supply of early vegetables will be secured, such as tomatoes, cucumbers, abbages, and so forth, which will be much enjoyed. This may seem a small atter to many farmers and not worth the trouble, but if tried will be found ne of those little things that contribute to the pleasure of life—that keep us heerful, contented, and in a happy frame of mind. We shall watch with great est these plants growing green and vigorous before other vegetation shows if above the ground. They tell us of what is coming; they strengthen our ith in the certainty of nature's arrangements, and encourage our hopes in the ture. There is a satisfaction in having our early peas, radishes, or lettuce at well repays all the trouble they cost.

Ten or fourteen days may be gained even without the use of glass by ing a bed of fine, rich soil well filled with warm compost, under the shelter

of a wall, and covering it at night and on cold days with boards or mat When the plants have been transferred to the garden cover them at night wm inverted boxes, screens, or even by shingles inserted on the north sides of the hills and inclined over the plant like a roof. Every farmer must be governed in this matter by circumstances, and guided by his own ingenuity. Only market gardeners, flower dealers and amateurs need incur much expense. But every one will find both pleasure and profit in some simple arrangement for bringing forward early flowers snd vegetables.

Another very simple, cheap, but effective style of hot-bed we have often le, by making a pile of fresh litter from the horse stable on the top of the gro about eighteen inches deep and a foot wider all around than the frame intended to be put on it.

The manure should be trodden evenly, firmly, and made level; upon it a frame of the size of the sash to be used, which may be made of inch boa ten inches high in front and fifteen inches high at the back, with the s the south, and a small stake in each corner driven firmly through the ma to keep it steady.

After the manure begins to heat put in from four to six inches of soil fine and level, and when in the course of a day or two that becomes w enough, which can be ascertained by thrusting in the finger, sow the seed in rows running with the slope of the frame.

The bed must be carefully watched, watered, and opened every day, so that neither the seeds nor young plants shall suffer from too great heat.

If the weather is very cold, or if the bottom heat seems to fail, bank up the frame all round to the top with fresh, hot manure firmly trodden.

In making a hot-bed it is a very good plan to take the soil from some spot in the garden upon which in the fall the rubbish has been burnt, as many foul seeds and insects will thereby have been destroyed, and the ashes won't hurt the bed.

A hot-bed made in this way can be removed as soon as the plants from it are set out, which will be soon after the garden is made. This style of hot-bed is within the means of any farmer who can get a load of horse manure and has an old window sash.

CULTURE OF VEGETABLES IN THE GARDEN.

With a supply of seasonable vegetables the farmer can, with very little meat, furnish his family food that is not only economical, but palatable and healthful. With asparagus, rhubarb, early and late peas and beans, potatoes, turnips, cabbages, onions, beets, green corn, early and late squashes, cucumbers, tomatoes, strawberries, currants, raspberries, grapes, and the larger fruits, a diet may be provided fit for a royal table; and if to these are added the egg plant, celery, salsify, and various pickles and preserved fruits, what more can be desired? There are numerous varieties of most of these articles, which come into use at different times during the season, and can thus be had in their best condition. When gathered fresh from the garden they have a delicacy of flavor that is wanting in those obtained wilted from the market, and they supply those juices and acids that the health of the human system demands, especially during the warm season.

Now, in our climate, this almost unlimited variety of delicious and wholesome vegetables may be had upon every farmer's table from June to November, at very little cost of money, and at a very reasonable outlay of labor and systematic care; and potatoes, parsnips, squashes, cabbages, beets, turnips, tomatoes, apples, dried fruits, peas and beans may be had in abundance from November to June. With this bountiful supply of nutritious vegetables, with milk, butter and eggs, who can live better than the American farmer? If does not have a well-furnished table it is his own fault. He cannot blame

kies or our soil, for in no other part of the world can a greater variety of luscious and well-flavored vegetables be produced.

In a letter which I received some years ago from a distinguished American gentleman then in Liverpool, it is said, under date of August 17:

"The supply of vegetables in an English market is much inferior to that in our own market-houses at this season. Potatoes are of excellent quality, better than in New England. Turnips are plenty, and cabbages in all their varieties are exceedingly abundant. But these are the great staples in the vegetable line on an English dinner table, now that green peas, which are never equal to our own, are going out of season. The bean tribe is very poorly represented by a few string beans, which are almost tasteless when cooked, and though shell beans occasionally appear, they never have the richness to which an American taste is accustomed. Indian corn in its green state is, of course, utterly unknown, and England will never be able to appreciate the luxury of a dish of succotash. All the squash family are strangers to the English table, although I have known of an attempt to raise them under glass, and have seen one or two diminutive specimens of the results.

"One vegetable, or rather fungous delicacy, which we comparatively lack, is the mushroom, and you may just now see here bushels of these poisonous looking toadstools heaped up among the scanty supplies of better esculents. In view of these facts it is no wonder that the Englishman should be a grosser flesh eater than the American, and it seems very certain that a vegetable diet can never be a luxurious or fattening one in this climate.

"As regards fruits, the inferiority is still more lamentable. An untravelled Englishman has no idea of the deliciousness of a peach, a pear, or even an apple, although I have been told of a certain apple called the Ribston pippin, which is said to have been equal to the best of our own, but which is now almost extinct. So far as my experience goes, the pigs of America would not thank you for better specimens of either of these fruits than I have ever seen in England, of native growth, excepting in a hot-house. It is only by extending the branches against a brick wall, heated by interior flues, that the horticulturists produce even the semblance of fruit in the open air. Their strawberries, it must be owned, are very large, but look much better than they taste But after all the wonder is, not at the failures, but at the successes of English horticulture, for a person accustomed to the almost tropical heat of our summer months cannot help being surprised that anything whatever should thrive in the watery sunbeams of what the English call their summer."

After having secured a suitable location, properly prepared the soil, and provided necessary shelter, the seeds should be sown or the plants set in rows at a proper distance from each other. A common fault in kitchen gardens is the crowding of plants too closely together. Each plant should have room to spread its roots, and to admit a free circulation of air to every part of it. In beds which are to be cultivated wholly by the hoe, the rows may be somewhat nearer to each other than where the horse hoe is to be used between them. Where culture by the horse hoe is practicable, it will save much labor, and is always desirable, except, perhaps, at the last hoeing, when the large plants will be more liable to injury. The hills of cucumbers, squashes, and melons should be at least eight feet apart, and ten would be better. Beets, parsnips, and carrots, should not be less than six inches apart in the rows. Nothing is ever gained by crowding them nearer than this. Sow plenty of seed, and, at the proper time, thin out the plants with an unsparing hand, and it will be found good economy at harvest time.

As spade cultivation would take too much time, a farmer's garden should be so arranged as to be ploughed easily. A very convenient form is to lay out the garden in squares twelve or sixteen feet each way. Around the border of the squares sow, in a single row, beets, carrots, onions, parsnips, bush-beans, &c., and in the squares, plant melons, squashes, cucumbers, pole beans, peas, sweet corn, &c.

In this way all the vegetables are much easier cultivated, have plenty of air, sun, and room, and grow fairer and to a better size.

It has been said the good farmer is known by the clean culture of his fields. This is more emphatically true of the gardener. In the rich, warm soil of the garden weeds grow apace, and will not only stifle the more slow-growing plants, but will withdraw from the soil the elements of nutrition they need as their size increases. Constant and careful hoeing is necessary to rapid and vigorous growing. It keeps the soil loose and mellow, so that it can be

easily penetrated by the warm air, and can absorb the dews and gentle rains, and gives opportunity for the tender roots to stretch out in search of food. The hoe should be used till the plants cover the ground; after that it w be likely to injure them.

Jethro Tull, one hundred and thirty years ago, said:

"As soon as the ploughman has done with his work of ploughing and harrowing, the soil begins to undo it, inclining towards, and endeavoring to regain, its natural specific gravity. The broken parts by little and little condense, unite, and lose some of their su Many of the pores close up during the seeds' incubation and hatching in the ..... As the plants grow up they require an increase of food proportionable to their i ... of bulk; but on the contrary, instead thereof, that internal superficies, which i... artificial pasture, gradually decreases. The earth is so unjust to plants, her own offspring, as to shut up her stores in proportion to their wants—that is, to give them less nourishment when they have need of more. Therefore, man, for whose use they are chiefly designed, ought to bring in his aid for their relief and force open her magazines with the hoe, which will thence procure them, at all times, provisions in abundance, and also free them from intruders; I mean their spurious kindred, the weeds, that robbed them of their too scanty allowance."

But attention to the plants in a garden should not cease with the use of the hoe. Dead leaves and branches and diseased plants should be removed. Injurious insects should be kept out if possible, and, if that cannot be done, the plants they infest should be thrown into the hog sty, that no eggs or larva may be left in the garden. Weeds should never be allowed to mature seed there, unless it is desirable to secure a crop of them for the next y Many farmers keep their gardens clean and take much pride in their appearance during the early part of the season, but permit the weeds spring up rapidly under the August and September rains to remain and their seeds. This insures them plenty of work for the following year. C culture during the entire season should be the invariable rule. Where pl are crowded, such culture is difficult, and this is another reason for giving t plenty of room.

From long observation and experience I am satisfied that no part of the farm of the same size, cultivated in whatever crop, is so profitable to the farmer as the garden, and no equal portion yields so rich a harvest of pleasure, comfort, and health to his family.

It is not to be expected that every farmer will raise all the varieties of plants in his garden. Let each select those that he and his family value most, and make them the objects of his special care. But there are some kinds which I think should never be wanting in any garden, and these are asparagus, rhubarb, currants, and tomatoes. The first three are perennial, and when once established in a good soil will, with clean culture and an annual dressing, continue to yield fruit for an entire generation. The first two are among the earliest products of our climate, and are relished by almost every one. Currants and tomatoes come at a later period, and furnish delicious and healthful acids at the very season when our systems, debilitated by the heat, require their cooling and refreshing influence. Both of these fruits may be eaten in a ripe state almost without stint in the months of August and September, not only without injury to the health, but as among the most effectual preventives of those diseases that are apt to prevail during the heats of that season.

Garden vegetables not only afford a pleasant and healthful diet to the laborer's family, but they are especially conducive to the health of sedentary men. Their bulk and laxative qualities furnish the stimulus which the digestive organs require. For the soldier and sailor living upon salted meats and dry bread their juices and acids are the only effectual safeguards against the scurvy, to which so many fall victims. Preserved vegetables and fruits are now put up in large quantities for sea voyages, and, when fresh ones cannot be obtained, are an agreeable substitute. Among the most valuable for this purpose are

horse-radish, potatoes, tomatoes, pickled cabbages, onions, cucumbers, and peppers. Those vegetable juices that contain lime are especially efficacious in all scorbutic affections. Malate and citrate of lime abound in the juices of the apple, the lemon, the currant, the grape, and the tomato. With a supply of these fruits, or, when the fruits themselves cannot be had, with the juices in concentrated form, furnished as a part of their daily rations, many men might have been saved for the service of the country who are now laid in distant graves or discharged from the army with enfeebled or broken constitutions. With the facilities for transportation we now have all our hospitals might be well supplied with fruits, vegetables, and vegetable acids. In the vicinity of our forts and permanent camps they may be easily raised, as in Prussia, by the soldiers themselves.

Asparagus and rhubarb both require a rich, deeply-worked soil. Late in autumn they should be well covered with horse manure, or with a compost containing night soil. This should be well worked into the ground with the fork. The ground should then be mulched with straw, coarse hay, or fine boughs. In the early spring the mulching should be removed, and the ground made light and clean by the fork and rake. No other care is necessary but to keep the ground free from weeds. Coal ashes have been found useful when placed around the roots of currants; they should be applied in autumn, and forked in in the spring. Spent tan bark may be spread in the rows between the bushes; it keeps the ground moist around their roots, prevents the growth of weeds, and is thought to be some protection against the borer, to whose attacks the currant is so liable.

As an appendix to the above remarks on garden vegetables I present the following table given me by a friend in Providence, Rhode Island, showing the cost per week of the vegetables and fruits consumed in his family of twelve to fifteen persons. He purchased day by day all that were used in his household, and kept an accurate account of the same. It shows the importance in an economical view of the vegetables used by New England families, to say nothing of what they contribute to health or the pleasures of life. With the exception of the large fruits, I think all the vegetables named in this estimate might easily be produced on one acre well cultivated as a garden.

Cost per week of vegetables for a family of from twelve to fifteen persons.

Spring.		Summer.		Autumn.		Winter	
Potatoes	$1 00	Potatoes	$1 00	Potatoes	$1 00	Potatoes	$1 00
Turnips	75	Turnips	1 50	Turnips	1 00	Turnips	75
Beets	50	Beets	1 00	Beets	1 00	Beets	50
Squashes	62	Squashes	1 25	Squashes	1 00	Squashes	62
Onions	12	Onions	13	Onions	12	Onions	12
Parsnips	25	Greens	75	Beans	1 00	Pickles	25
Cabbage	50	Lettuce	75	Green corn	1 50	Cabbage	50
Celery	1 00	Radishes	2 00			Celery	1 00
Pickles	25	Beans	1 00			Beans	33
Beans	33	Peas	2 00				
		Green corn	1 50				
		Cucumbers	50				
		Tomatoes	1 50				
	5 32		14 88		6 62		5 07
For 13 weeks	69 16	For 13 weeks	193 44	For 13 weeks	86 06	For 13 weeks	65 91

Total vegetables, $414 57. Fruit per week: Apples, $1; peaches, $2; strawberries, $5; raspberries, $1; pears, $0 50; cherries, $1; blackberries, $1; melons, $1. Total fruits, $12 50.

FRUITS IN THE GARDEN.

In soil suitable for a garden, apples, pears, peaches, plums, cherries, quinces, and grapes may be cultivated with success, especially if proper shelter is provided. The trees in the garden should be so arranged as not to injure by their shade the other plants. When trees have become so large as to shade the greater portion of the ground, scarcely any vegetables can be profitably cultivated among them. Currants, gooseberries, and beans will do better than any others. Grass can be raised with profit under trees, but trees will not do well in grass, unless, perhaps, where the land is freely top-dressed every year. When young trees are making wood so freely that they do not produce fruit, which is sometimes the case in a highly manured soil, it may be expedient to lay down to grass for two or three years. The land should then be ploughed, and the decomposition of the sod fertilizes the soil.

A successful fruit grower of my acquaintance has practised the following rotation in the culture of his orchards: The first year, plough, manure, and plant potatoes; the second year, plough, manure, and sow oats and clover, and mow the oats for fodder; the third year, take off the clover crop and plough in the fall, preparatory to the potato crop which is to follow. Thus the land is manured two years out of three, and good crops of oats and clover are taken off, and a tolerable crop of potatoes, without apparent injury to the trees.

Of all fruits grown in the northern States the apple is the most easily raised, the cheapest, the most durable, is capable of being used in more ways than any other, and is probably the most wholesome and nutritious. Every family uses apples to a greater or less extent. Where sweet apples can be had at low prices they are used as commonly on the table as potatoes, and, since the high prices of the latter have prevailed, have been even more extensively used in some districts. Sweet apples require no sweetening, and baked, stewed, or made into puddings or pies are delicious and nourishing food. The garden cannot take the place of the orchard, but every garden should contain an "Early Harvest" tree, a "Sops-of-wine," a "Williams," a "Porter," and a "Fall Pippin," and two or three early sweet apple trees if possible. In a large garden, a part of which is appropriated to fruit, many other varieties, such as come into use at different seasons, should be introduced, so as to secure a supply for the whole year. By a little care when planting the trees this may easily be done. One acre in well selected varieties of apples will yield more food to the farmer's family than the same amount of land in corn or potatoes with half the outlay in money and labor.

A common error in apple culture is the setting of the trees too near each other. Thirty feet apart is better than nearer. Apples need sun and air No fruit, unless it be the grape, is more dependent on the sun for its flavor and color than the apple. Where it is intended to cultivate the soil by the plough and horse hoe, the trees should not be permitted to branch too near the ground. Some varieties, as the Rhode Island Greening and the Bellflower, have the habit of branching low. These should be planted where the soil may be cultivated with the spade. By properly pruning the lower limbs when the trees are small they may be trained to a better habit. Trees that have branches too low in the nursery should be rejected.

Pruning is an important matter, and one which I have not place here to discuss. I will only remark that spring pruning should never be allowed. From long experience I am satisfied that June and November are the best months for this work.

PEARS.

In the cultivation of pears a deep, rich soil, well drained, is absolutely necessary to success. In a cold, wet soil disease commences at the root; the juices become stagnant and unfit for vegetation. Pear trees will suffer from

ght in a thin soil, but in a thoroughly drained one they send their roots r and obtain moisture. Pears upon pear stocks will live longer, become trees, and in general are less subject to disease, but those varieties that thrive on the quince stock will yield fruit earlier than on their own. In g pears grafted on the quince they should be set into the ground three or nches deeper than the junction of the scion with the root and *kept cov*and in due time the pear wood will throw out roots from its own sub. Those varieties that naturally grow large and thrifty are not suitable on to quince stocks, as they make wood faster than the root can sustain l the root becomes exhausted.

ır trees should always have clean culture. Plenty of fine compost should ll mixed with the soil in the autumn by means of a fork, and the ground d the trees mulched. In the spring the mulch should be removed, the d stirred thoroughly with the fork, and the mulch replaced. Where salt r rock-weed can be had they are preferable to anything else for mulching on account of the salt they contain. Where they cannot be obtained a quantity of salt is a valuable addition to the manure.

ır trees require rather severe pruning, which may be done with a sharp in the spring. Large limbs should never be taken from them, as the ıs heal with difficulty. The common fault of pear growers is to allow ees to bear too large crops. When they are young, and the fruit sets lantly, a great part of it should be picked off. The remaining fruit will uch finer, and the trees will not be exhausted by the crop, which is apt the case when all the fruit that sets is suffered to grow. An almost und variety of pears may now be obtained at the nurseries, and cultivators indulge their taste and fancy in the selection, but no man will find it able to attempt the cultivation of a great number of varieties. A dozen in a garden are better than a larger number. Indeed, the possessor of a good sorts has no occasion to envy him who possesses more.

ny gardeners complain of repeated failures in their attempts to grow the ıpon the quince stock. I think if the two following conditions were care attended to such complaints would be less frequent: In the first place, such varieties only as are suitable to be grown on the quince; and dly, set the roots at such a depth in the soil that the place of joining be at least four inches below the surface, and keep the earth well pressed d the body of the tree. When these conditions are faithfully observed will be obtained some years earlier than when the pear stock only is used, as permanently.

e following varieties are stated by Mr. Wilder, one of the most extensive growers in the country, to be those which succeed well on the quince: *é d'Amanlis, Louise Bonne de Jersey, Belle Lucrative, Urbaniste, Duchesse oulême, Beurré Diel, Beurré d'Anjou, Vicar of Winkfield, Winter Nelis, Morceau,* and *Easter Beurré.* Some varieties do well in one situ which will fail in another. Hence experience is the only guide. A well ed, clayey loam may be set down as the soil best adapted to pears, though will often succeed on others.

ar a good market, and where circumstances are favorable, pear culture be made extremely profitable. In the pear orchard of Mr. Bacon, of ury, Massachusetts, which contains about six hundred trees, there is one, rop from which, in 1861, was sold for forty-eight dollars; and another, a *ré Diel*, the crop from which, in 1859, was sold for eighty-two dollars. Bacon sells many pears every season at prices ranging from $1 50 to 0 per dozen.

st of the finer pears should be gathered before they are quite ripe, and upon shelves or in shallow boxes in a cool, moist atmosphere. They may ved to a warm, dry place a few days before they are to be used.

PEACHES.

In former years peaches were among the most beautiful and delicious of fruits. In no part of the country were they finer or more highly flavc in the southern parts of New England. But for a few years past an disease has prevailed among them, by which in many sections they l wholly destroyed. It is believed, however, that the crisis has now passed within the last two years cultivators have again been planting them.

The peach tree likes a warm, gravelly soil, grows rapidly, and cc bearing in three or four years from the bud. It is short-lived, and after ing a few crops begins to fail. The best way to cultivate the peach is to a succession of young trees to take the place of the old ones as they fail.

PLUMS.

Few fruits are more beautiful on the tree or more tempting in the plums. As a dessert they are everywhere in favor, and are extensively as a preserve; in either form they are wholesome and nutritious. I around us adds to our happiness, if our tastes are rightly cultivated, and can be more beautiful than a well-managed plum orchard near a favorite window, where, after the fragrant blossoms are gone, we can look upon dark red of the Golden Drop, the faint green of the Imperial Gage, the yellow of the Jefferson, and the pale crimson of the Washington?

Plum trees are hardy and easily cultivated. They are suited to our c unless the black wart is a climatic disease. They flourish better on r than on sandy soil. Of late years many gardeners and orchardists have deterred from setting them on account of the black wart and the curculio. No remedies seem yet to have been found for the former. The curculio tinues its ravages only for a short time and may be prevented from much mischief by timely application of fine lime, plaster, or ashes. should be sifted over the young fruit two or three times a week for a month.

Among the best varieties of this fruit are the Golden Drop, the Imperial Gage, the Jefferson, Washington, Green Gage, Purple Gage, Lawrence's Favorite, and Smith's Orleans.

SMALL FRUITS IN THE GARDEN.

Large fruits may be cultivated to perfection in the orchard, but small fruits find their appropriate place in the garden. The most important of these are the currant, the strawberry, the raspberry, and the grape.

I have already referred to the healthful influence of fruits on the system depressed by summer heats. The very presence of a dish of fresh and juicy strawberries, currants, or raspberries upon the tea table is refreshing to the sight and stimulating to the languid appetite. Compared with them all other condiments are tame and insipid. As health-imparting medicines no sugar-coated pills or pellets can compete with them.

CURRANTS.

The currant requires a good soil and clean culture. The addition of a little compost in which ashes are mixed will insure a crop every year. In the open sunlight they are less subject to blight, but will yield tolerable crops in the shade. A row of currants on the north side of a tight fence will not ripen so soon by ten days as one upon the south side. In this way the season for enjoying them may be prolonged. There are several varieties in common use. The large kinds are in general the most acid.

The common Dutch red and white currants are hardy, and, perhaps, on whole, the most valuable. The old and moss-covered wood should be cut in the spring, and the branches not be allowed to grow too large and spre ig.

mming cut the wood as low as possible; if buds are left on the stump vill immediately throw out sprouts.

STRAWBERRIES.

ere is perhaps no fruit that grows so universally in every part of the as the strawberry. It is found in the snowy regions of the north and e sunny plains of the south. It grows in the valley, and creeps to the it of the hill. It is a universal favorite with all races of men.

a suitable soil strawberries are immensely prolific; as many bushels of as of potatoes may be raised on an acre. One hundred and fifty bushels been taken from an acre in a single season. No strawberry has a higher her flavor than the common wild fruit; but by cultivation they have be- much larger and more prolific. By raising them from seed many fine urge varieties have been obtained. New kinds are brought forward every Berries of an inch in diameter are not uncommon in the market.

awberries are fond of a moist, rich loam, and thrive best where they have r of water. They may be set in the spring or autumn. I have had the uccess with them set in the spring. The soil should be deep and mellow 'ell filled with fine compost. Set the plants about eighteen inches apart rs, and give them clean culture. If it is intended to grow them upon the spot for two or three years, the runners should be cut off as they shoot nd the ground be kept loose with the hoe. A favorite method with some ners is to set the plants in rows two feet apart, and cultivate lettuce, rad- or early beets in the spaces between them. These are removed about me the fruit ripens; the runners are allowed to grow, and are directed he vacant places. After one crop has ripened, the old roots are taken ith the spade, and the new roots made by the runners are cultivated for ext crop. Thus alternate rows are produced. The new roots are thought 're the finest berries. Many believe this to be the easiest and best mode lture, and the success obtained by it in the vicinity of Boston seems to y this belief. Some cultivators receive a thousand dollars per acre for the

e land should receive a liberal dressing of stable manure in the autumn, he plants be covered with leaves, sea weed, or pine boughs. In the remove the mulching, and work the ground with the fork, taking care disturb the roots. Some gardeners use liquid manure in strawberry cul- Two or three pounds of guano to a barrel of water will make a fertilizer may be applied with decided advantage. Remarkable effects are some- produced by the application of sulphate of ammonia, sulphate of soda, te of soda, or nitrate of potash dissolved in a large quantity of water. should be applied with the watering pot, about the time the fruit begins , and may be continued once a week while the plants are in bearing. bundant supply of water is the best means of prolonging the bearing sea- When irrigation is practicable, streams of water should be led between ows until the soil is well saturated, and the process repeated once in four re days. It has been stated that by this means strawberries have been in bearing three months. Fortunately different cultivators select different s, each according to his taste, and thus many varieties are brought into use. most every section of country has its favorites. Among the good varie- I will mention a few: Hovey's Seedling, Burr's New Pine, Brighton Pine, t's Seedling, Wilson's Albany, Bunce's Seedling, Triomphe de Gand, Scarlet e, Diadem, Eclipse, Minerva, Imperial Scarlet, Florence, Prince's, Sirius, Longworth's Prolific.

RASPBERRIES.

Among the smaller fruits the raspberry holds a high rank. It mediately after the strawberry, when fruit is rather scarce, it usually com a good price in market. Its pleasant flavor, and cool, refreshing render it a favorite fruit. Some of the finer kinds are too tender for tra tation, but may be cultivated for home use. The plants grow rapidly re quire little care except to be kept clean. The best soil for them is a deep moist, and rather sandy loam. They bear liberal manuring. In the au the old canes and the weak new ones should be cut away, and healthy ones left for the next crop. They should be headed in to wit four feet of the ground, and be tied to stakes.

Among the varieties deserving of attention are the Red Antwerp, the New Red Antwerp, Fastolf, Franconia, Catawissa, Brinckle's Orange, Knevett's and the English. But few persons are aware of the value of this fruit, or of the extent to which it is grown in some places. In the town of Milton, county, New York, there were, a few years since, one hundred acres devoted to its cultivation. The harvesting continues about six weeks; during time men, women, and children are engaged plucking the fruit; about two hands are employed on each acre. The work commences as soon as is off the plants in the morning, the berries being picked into small baskets, which at evening are packed in boxes and sent by steamboat to York city. The average daily export through the season is ten thou boxes, which, at ten cents per basket, amounts to $1,000 a day, or $42,000 per season. Twenty tons have been sent from this one lan day.

GRAPES.

I do not propose here to enter upon the subject of vineyard culture, w has been greatly extended within a few years past, especially in the States, and in Ohio and Missouri, as well for supplying the markets with delicious fruit as for the manufacture of wine. I shall confine my remarks to the culture of the grape in gardens.

Every householder may have a grapevine. It will grow in the corner of the yard or by the side of the porch. It may be trained on the roof of the wood shed, on the side of the barn, on a simple trellis, or on a single stake. The corner of the garden, which would not be convenient for a tree, will afford space and shelter for a vine. Its fruit not only makes a most delightful dessert, but in the sick room nothing can take the place of its cooling and refreshing juices.

The grape thrives best in a good warm soil, not excessively rich, but and mellow. Lime, old plaster, ashes, bone dust, scrapings from the leaf mould, or any well-rotted vegetable matter, make the best dressings for grape. Green manures, animal substances, night soil, or other stimulating manures will force out a large growth of wood and foliage, but will add ing to the quality of the fruit, and retard rather than hasten its maturity. Grapes that mature in season to escape the early autumn frosts are the ones that merit the attention of cultivators in the northern States. Seven new early varieties have been introduced within a few years. Grape-growers are directing their efforts especially towards the production of early sorts, not without the promise of ultimate success. The Isabella was formerly the finest grape grown in the north; but, except in very favorable circumstances a crop was not matured oftener than once in three or four years. Some seedlings from the Isabella have made several days' advance upon the parent vine in the season of ripening, with little or no loss in the quality of the fruit. Such sorts as originate in particular sections of the country generally become fav

ıich shows that thorough acclimation is necessary to success in

ner varieties are liable to be winter-killed in the New England
il the vines become too large, the safest course is to lay them
ember and cover them with earth. They may be trained upon
s, or stakes. After the fruit has set, the buds should be pinched
three leaves beyond the fruit. Cut or pinch the side shoots off
out. When they are laid down in November, the new canes,
be the bearing wood for the next year, should be headed in, so as
ew fruit buds on each one; from two to four are better than more.
; fork up the ground thoroughly around the roots, and keep it
ı the season. Soap suds, diluted urine, or weak brine may be
al times during the summer with benefit.

liscussion of the subject of the climatology of the grape, the reader
a valuable article by James S. Lippincott, esq., in the report of
ent of Agriculture for 1862. There are also many interesting
ınected with vineyard culture which, as before stated, I do not
ıuch at this time; but will close my remarks on this topic by
of the hardier varieties adapted to out-door culture in the north-
No grape can be considered hardy that does not thoroughly ma-
before the frosts of autumn. Unripened wood will almost inva-
ed by our severe winters.

ɜst grapes here are the Clinton, King, Logan, and Delaware;
; come the Concord, Hartford Prolific, and Northern Muscadine;
:hese may be reckoned the Adirondac, Union, and Oporto; and
New England and the middle States, the Isabella, Diana, Rebecca,
id, Lenoir, and Catawba. In this list I refer rather to the hardi-
ne than to the quality of the fruit.

ner should have at least a dozen grapevines about his house or
; and thus, with little labor, he may secure from one to two hun-
of delicious fruit annually for his family and his friends.

:G, GATHERING, AND PRESERVING SEEDS FOR THE GARDEN.

r spoken briefly of the several leading points relating to a farmer's
ıs its products are, most of them, not perennial, but require annual
care, some suggestions in regard to *raising*, gathering, and *pre-*
seem to be all that is necessary to enable the most inexperienced
ınd manage a garden with entire success. Much inconvenience,
ɜxation of spirit" are constantly experienced through a want of
nd though its careful preservation has been urged for more than a
rs, most persons are still careless or indifferent about it. Columella,
out the time of our Saviour, in some remarks upon the importance
ıe best seeds to propagate from, says: "I have this further direc-
that when the cornes are cut down and brought into the threshing
ld even then think of making provision of seed for the future seed-
s is what Celsus says: 'Where the corn and crop is but small
ɜt the best ears, and of them lay up our seed separately by itself.'"

here spoken of are probably wheat and other small grains, but
are applicable to all seeds for planting. The farmer raises Indian
ly use in a green state. No garden would be considered well sup-
; it, and its value is increased by its earliness, and specially if it
ɜet. Where care is exercised in selecting the soundest and best-
of this grain, and those which are the earliest ripe, and continuing
for a succession of years, it is found to be greatly improved as to
s maturation. The same remark applies with equal force to other

vegetables, roots as well as grains. Let me, then, particularize a little, and first, as to

WHAT SOIL IS BEST FOR THE PRODUCTION OF GOOD SEED.

A very rich soil in most cases develops *foliage* rather than seed. perience has been that the *best* seed, and often the greatest quantity, is obta from a soil naturally good, but not excessively enriched. Seed-plants s have more space than is generally allowed, abundance of light and particularly of nourishment at the time of ripening, being essential to dev ment and full perfection. When seeds are extensively grown for the for instance, the beet, carrot, parsnip, cabbage, &c.—they are generally much too densely, the object of the cultivator being to secure the gr quantity from a given space of ground. If dry weather occur at the ripening—seeds so raised have little else than the form: they lack fuln deficient in weight, and a large per cent. will prove abortive.

WHAT TIME TO SET SEED-PLANTS OR SOW SEEDS.

Biennials, particularly cruciferous plants, cabbages, turnips, radishes, &c. should be set early, as soon as the frost is well out of the ground. The cabbage and the turnip, when set for seeding, suffer from the heat and dryness of the summer; but they are generally injured far more by the vermin and mildew to which they are peculiarly liable later in the season. The earlier such seeds can be ripened, I think, the better. As respects the onion, carrot, beet, and most esculent-rooted biennials, the practice should be the same. With me crops of these seeds have been uniformly greater and of better quality when the roots or bulbs have been set early, than when the transplanting has been delayed till the season has somewhat advanced.

It should, however, be remarked, that my soil is loamy, light, and warm, resting on a gravel. On a heavier, that is a more moist, soil, it would probably become necessary to set the plants a little later.

No general rule can be given which will be applicable to all soils.

The cultivator must exercise a sound judgment in the matter.

Annuals vary so much in character that no general directions can be given for the time of sowing. Many of the hardier kinds succeed best if sown in autumn just before the closing up of the ground. Some of the earliest and finest of table beets are raised from autumnal sowings, (classing the beet as it is usually cultivated as an annual,) and the parsnip, onion, and carrot, sown at the same season, are often successfully sown. Tomato plants and many other garden vegetables that spring up self-sown are generally much superior in strength and vigor, in early maturity and productiveness, to plants raised from seed sown in spring in the open ground. The cucurbitaceous plants of the garden—cucumbers, melons, squashes, &c.—are decidedly tropical, and must be classed as tender annuals. They vegetate best where the soil is warm and comparatively dry at the time of planting; but however early planted, or well they vegetate, they rarely make much progress till the occurrence of settled summer weather; and these remarks apply also to the common garden beans, particularly to the running varieties, the latter as a class, being less hardy than the dwarfs.

WHAT PLANTS ARE INJURED BY INTERMIXTURE.

It is to be regretted that a subject so important should be generally so little understood. Take, for instance, the squash and pumpkin. How few there are who either grow the plants properly, or save seed judiciously; and how few have the knowledge and skill to long cultivate and retain a variety of the musk or water melon in its purity! The numerous varieties of squashes and pumpkins cultivated in this country may be divided into three classes, viz:

Those with lobed leaves, and clavated or club-shaped furrowed stems, all of what are known as field pumpkins, the Summer Crookneck, and squashes, the egg squash, orange squash, and others.

l. Those with entire leaves and an *irregular fleshy* stem, including bard, Boston Marrow, Honolulu, Porter, Turban, Mammoth, and others,

'. Those with entire leaves, and a clavated or a club-shaped stem, as ter Crookneck, Canada Crookneck, Striped Crookneck, Cashaw, and a t oblate striped variety, imported from the West Indies, and seen in ible quantities in our city markets in April, May, and June.

classes will not *ordinarily* be affected by cultivation in the vicinity of r, though the individuals composing a class mix with great facility. nce, the Canada Crookneck may be grown with the common field , or with the Hubbard, or Boston Marrow, and will generally retain , neither affecting or being affected by the neighboring plants; and ther hand, the common field pumpkin, or the common varieties of h squashes may be grown with the Hubbard, Marrow, or Crookneck l security. But the members of each class must be cultivated apart 1 other, as the pumpkin mixes readily with all the varieties of summer ; the Hubbard with the Marrow and Valparaiso, and *vice versa;* and da Crookneck with the Winter Crookneck, and the variety from the lies, &c., &c.

uskmelon and the watermelon, being botanically quite distinct, are not as being liable to intermixture when grown in close proximity; but so e the varieties of the muskmelon to change and degenerate, that of the umberless kinds which have from time to time been introduced, scarce ould now be found that in size, form, color, and quality will compare original; and the same is true with regard to varieties of the watermelon. orated kinds so recently introduced by the late Dr. Brinckle, of Phila- seem already to be disappearing, either by being gradually absorbed es previously cultivated, or becoming merged in each other. Of the , every year adds to the long catalogue of sorts. Very recently a and eighteen sub-varieties of what is known as the "London Long have been experimentally cultivated at the Chiswick Gardens, in not ten per cent. of which, judging from the past, may be expected ue long in cultivation, or even to be known in a pure state twenty come. The kinds commonly found in the gardens of this country are mber, and readily intermix when grown near each other. Seedsmen e best seed possible of any genuine sort and cultivate by the acre *for nly*, and by this course retain a variety in a tolerable state of purity. ry gardens, where a few are grown for the table, (the early frame, ned, and long Turkey cucumbers being perhaps planted promiscuously the seeds, so far as respects the reproduction of the parent stock, considered comparatively worthless.

ma bean is greatly injured by being grown in close proximity to the which it is botanically allied. The seeds decrease in size, and the lf seems to degenerate. Some varieties of the bean seem very perma- haracter; for instance, the round yellow six-weeks and the running , both of which have been common to our gardens for more than a nd which have slightly, if at all, changed since their introduction; horticultural, dwarf horticultural, dwarf red cranberry, and many e peculiarly liable to intermix and degenerate. If a farmer or gardener seeds of this vegetable for planting, the best course is to sow the varie- from each other; but if he is annually dependent on the seedsman for y, the method of cultivation is less important, and the dwarfs or run- may be planted about his grounds as taste or convenience may suggest.

Different varieties of the best readily intermix when not near each othe seeding, as do also the different kinds of carrot, cabbage, and turnip. A sing umbel of carrot seed sowed last season for the purpose of testing the fact pro duced roots which varied greatly in color; some were orange and some wer pale yellow, with numerous intermediate shades.

WHAT PART OF THE STEM PRODUCES THE BEST SEED.

It is the prevailing opinion that the central shoot or central umbel the finest seeds. The side shoots are later in development, slender and w and the seeds they produce, if they differ in no other respect, are sma generally less perfectly matured. Among umbelliferous plants, as parsn celery, carrots, &c., the central head is first put forth, is almost in much the largest, blossoms and matures in advance of all others, and th will much outweigh the product of any other single umbel that may afterwa be produced. It is proper to add that as among animals so among "like, in a greater or less degree, produces its like." The practice of a ing the parsnip to remain in the ground during winter, and to be grown for seed where they were sown, is wrong. The better course is to take th in autumn, and in spring—as is the custom with careful growers of the and carrot—select the smoothest and most symmetrical roots for transpla as when allowed to seed where they were sown, there can, of course, no choice of roots, and they must consequently be saved indiscriminately f deformed and branching roots, as well as possibly from the more smooth regular.

The seeds of the cabbage obtained from decapitated stems are comparatively worthless. For a long period it was almost the universal practice, both in this country and Europe, to cut off the heads from time to time during the fall and winter as they were required for use, or for the market, and to set the stumps in spring for seed. The result of this course was precisely what might have been foreseen—the heads grew small, comparatively loose and open, and, what was soon worse, a large proportion of the plants refused to form any head at all. But when gardeners and seed-growers selected the largest, most solid, and finest-formed heads, preserved them carefully during winter, and set the plants *entire* in spring, the effect was almost immediately apparent, not alone in the increased proportion of the plants producing heads, but also in the larger size, greater solidity, and general superiority of the heads themselves. Compared with the trouble and expense attending the preserving and setting the whole plant—involving, of course, the loss of the head on the one hand, and that of selling the heads and raising the seeds from the headless stems on the other—the difference in cost is necessarily larger; but the real superiority of one kind of seed over the other can hardly be overestimated. The fine heads of lettuce seen in our market late in winter and during spring have been the result of this course of culture—the selection of the finest-formed and most compact heads for seed-plants.

Certain rules observed in the selection of seeds of the bean will make the plant dwarfish or increase their height and size—will make a variety earlier and less productive, or later with increased yield.

Take the horticultural as an example of the running varieties. If the first ripened pods—which are the lowest—are selected for seed, and if this practice is continued for a few years, the variety will become almost as early as the Early China, and, indeed, almost as dwarf. Or, if the green pods are plucked for use during the summer, and the few pods at the extremities of the vines that have escaped being served at table, be resorted to for seed, the plants will be tall, comparatively slender, and the pods will form late in the season and high up the stem. The same is true of the dwarfs. The best course in small gardens, where the grower plants his own seed, is to leave a sufficient number

tirely unplucked. There is little difficulty in so cultivating vege-
induce *earliness*, but *it is always at the expense of the number and*
and the health, vigor, and complete development of the plant.
ltivation of the cucumber a gentleman for nearly or quite twenty
the first developed fruit nearest the root for seed. At the expira-
time, few of the plants attained a length of three feet, and the
e fruit seldom measured above three inches in length! It is true,
come *very early*, but the plants were so dwarfish and the yield was
t the crop did not pay for cultivation.
ır garden or field products require more skill in culture and man-
n the squash and pumpkin. To plant apart from other varieties,
raise large *crops* of these vegetables, is not all that is essential to
ropagation and cultivation. To raise large *specimens* is also com-
ısy; but to cultivate a variety for many successive years and re-
purity will be found a more difficult matter. Take, for example,
Crookneck. In its purity the skin is of an even cream yellow, the
ı red, fine grained, quite saccharine, of pleasant flavor, and the
ght not above four pounds. Now how is the variety lost? Sup-
rower to have a stock of seeds strictly pure, and his crop to cor-
ı the description just given. During winter and spring they are
time used in his family, but two or three happening to be *larger*,
upposes, consequently finer than the rest, they are at once care-
d as the most suitable for seed. The next season, and the next,
s uniformly pursued, until this, the most delicate of its peculiar
es lost in the huge proportions of the green, yellow, or striped
knecks, weighing fifteen, twenty, and perhaps even thirty pounds!
cultivator would keep in view the normal size of this variety, re-
that much of its superiority over the larger sorts lies in its con-
tness, and plant seeds from well-ripened specimens of about three
ht, and continue the practice, he would retain his squash in its
ıave a grade of excellence equal, if not superior, to any other
ıen the *Boston Marrow*: when first introduced, it was symmetrically
n, with an almost deep red skin, and the weight averaged about
As now found in our markets, the weight varies from eight to
ıds; and the color, instead of the deep red of the original, has
ight, cream yellow, almost betraying in its pale exterior how much
ıe properties have been diluted by this increase of size. If the
preserving seed from the largest specimens be long continued, it
surely end this excellent variety in some monstrous nondescripts,
e else but to be admired at a cattle show, and give variety to the
for our farm stock. One of the most successful growers of the
ısh in the vicinity of Boston saves his seed from the smallest well-
he can select, often from those not weighing above three pounds;
ns that, under this practice, the vines are more hardy and more
ırers, and the fruit is superior in all respects to that obtained by
ə old custom of planting from the largest fruit.
ms to be a strange fascination in size, but it should be remembered
nce is not always comprehended in magnitude; and though we
ıle apple, pear, or peach, and though we cultivate our small fruits
ıst perfection, many of our garden vegetables—our potatoes, beets,
shes—beyond certain dimensions are actually worthless for the
ıis is measurably true of our squashes. Could we have the Can-
ck, Boston Marrow, Hubbard, or any of the best table sorts of
he Mammoths sometimes seen at exhibitions, it would hardly be
r what disposition could a family of average size make of the

huge mass of flesh within the ribs of such a vegetable monster? It would literally perish in the using.

It has been remarked that American-grown seed-peas succeed much b in this country than imported seed of the same varieties. This is true no alone as respects the pea, for a large majority of our garden vegetables succ much the best when raised from American-grown seed. Onion seed of Englan French, or German growth rarely, if ever, succeed well when sown in country, even though the variety may have been of American origin.

The influences of climate, of course, are great; but to these there sh be less regard on the part of foreign cultivators as to the quality of the bulbs for seed. The careful American cultivator selects the fairest, b or tioned, and above all, the best-ripened bulbs for his seed, and there is positive evidence that this course, if long continued, will result in the improvement of the crop in size, quality, and the increased proport plants forming large and well-ripened bulbs.

WHEN SHOULD SEEDS BE GATHERED AND HOW PRESERVED?

Seeds should not be gathered until fully ripe. The rule for cutting w and other cereals before it is thoroughly ripened will not apply wh grain is to be used for sowing again. After gathering, the seed sh s thoroughly dried and stored in cool, dry, and well-ventilated apartments; however thoroughly dried, and however cool and airy the locality where may be stored, they should be divided into small packages, for when stored in masses they are extremely liable to generate heat and lose their vitality.

No complaint of seeds is more common than this, that "sweet corn will not come up." And the remark is a true one; it does not come well, so that thousands are annually disappointed by failing to secure this cheap, wholesome, and delicious garden vegetable. I have no more trouble in bringing it than in the common yellow corn, because I see that my seed is thoroughly ripened, and when gathered hung up in an airy place, and entirely beyond the reach of frost until it is completely dry. Sweet corn is full of juice, and requires a considerable time to become dried through both kernel and cob. The common practice is to gather it, perhaps before it is ripe, throw it upon a floor or hang it in some exposed place, where the frost reaches it before the cob is dry and destroys the vegetative power of the kernel. Then, of course, the seed is worthless for the purpose of planting. So it is with some other fleshy seeds, such as the cucumber, and sometimes even the tomato.

Seeds that were excellent originally, are frequently impaired by being brought on shipboard from foreign countries. It is found almost impossible to prevent a slight dampness, and this, together with the warmth of the place in which they are kept, induces the first stage of germination or mould, either of which is sufficient to destroy the vitality of the seed.

An experienced seedsman informs me that the best way of keeping seeds is to wrap them in substantial paper in small parcels, then enclose them in strong bags and hang them up under the rafters or beams in the attic, tool-house, or some similar place.

Some persons transplant mangolds, parsnips, and beets, but the practice is not a good one with any of the "tap-rooted" or fusiform plants. In testing parsnip seed to ascertain whether it is good, I find that each seed that germinates sends down a root four or five inches long by the time the leaves have attained half an inch in length. If the point of this root be broken off, even though near its extremity, the parsnip will be quite likely to be short and fibrous instead of long and fair. I made some satisfactory experiments in this respect last spring and summer. The best way is to test most seeds in the house. Any old box will answer the purpose. This simple precaution will save delay and disappointment. If the seeds come well in the box, sow some

ne kind in the garden, reserving enough to fill the vacancies that may occur. I would recommend to transplant, however, in preference to acant places.

TIME THAT SEEDS WILL RETAIN THEIR VITALITY.

can be no positive data given as to the time that seeds will retain ility, because in the nature of the case the circumstances under which placed will scarcely be alike in any two instances.
llowing table has been handed me by a seedsman of much experience, obably as correct and reliable as anything we can get.

.....	5 to 6 years.	Parsley.....	2 to 3 years.
.....	2 to 3 years.	Parsnip.....	2 to 3 years.
kinds.....	2 to 3 years.	Pea.....	5 to 6 years.
.....	3 to 4 years.	Pumpkin	8 to 10 years.
.....	5 to 6 years.	Rhubarb.....	3 to 4 years.
.....	2 to 3 years.	Squash.....	8 to 10 years.
.....	3 to 4 years.	Lettuce.....	3 to 4 years.
on the cob.....	2 to 3 years.	Melon.....	8 to 10 years.
.....	8 to 10 years.	Mustard.....	3 to 4 years.
.....	1 to 2 years.	Okra	3 to 4 years.
.....	5 to 6 years.	Spinach.....	3 to 4 years.
.....	2 to 3 years.	Tomato.....	2 to 3 years.
r.....	5 to 6 years.	Turnip.....	5 to 6 years.
.....	2 to 3 years.	Pepper.....	2 to 3 years.
.....	2 to 3 years.	Radish.....	4 to 5 years.
d.....	2 to 3 years.	Salsafy	2 to 3 years.
.....	2 to 3 years.		

HERBS.

.....	3 to 4 years.	Hyssop.....	3 to 4 years.
.....	2 to 3 years.	Lavender.....	2 to 3 years.
.....	2 to 3 years.	Sweet marjoram.....	2 to 3 years.
.....	2 years.	Summer savory.....	1 to 2 years.
.....	1 year.	Sage.....	2 to 3 years.
.....	2 to 3 years.	Thyme.....	2 to 3 years.
.....	2 to 3 years.	Wormwood.....	2 to 3 years.

cident mentioned in the "Canada Farmer" is worth noticing. Mr. owlson says, that having some half dozen packages of garden peas of varieties, and some beans labelled "Agricultural Beans," which had a lumber room as valueless for eleven years, he sowed them as an ex-. Almost every one vegetated and produced an excellent yield.
lds that they were put up in strong brown paper bags of fine texture,) as to exclude the air.
space allowed I might speak of several other topics in connexion) farmer's garden, such as the gathering and keeping of fruit, the in-)f the atmosphere on plants, the diseases of plants, insects, birds, bees, mplements, and other things.
sing intelligence, taste, and wealth have converted many things that e luxuries into the comforts and even the necessaries of life. Every o cultivates even a small garden, and who has a taste for beauty, can ament to his culture; can mingle with those plants that are sweet to , and which are designed to nourish the body, such as are pleasant to ; and as shed an agreeable fragrance around him.
)f wealth and those who wish to create rapidly a world of beauty hem may employ an artist, but every farmer should be his own artist. as implanted in every man a love of the beautiful, and this, if cultivated, ome to him a source of pleasure and enjoyment. Not every man can it every one can make a picture; and where can a more beautiful pic-found than is presented by a well-arranged, well-cultivated garden?

A cultivator can make a garden anywhere; among the rocks, upon th declivity he can form a terrace, by the side of the running brook, around a pond, along the border of the marsh he can make the beautiful flower up. He can form beds of rich vegetables, and borders of roses and pink verbenas. He can arrange them in straight lines or in curved lines; he form them into squares or parallelograms, into circles or ellipses, into tria or hexagons, into any forms that may best suit the nature of his gr please his fancy. He may so arrange the vegetable forms that spring from ground, and which in themselves are beautiful, and so combine their shades and hues, as to increase and brighten the beauty of the whole; and he d his picture in a beautiful frame. He can surround his garden with a greens, forest and fruit trees, so arranged as to give shelter to the plants that require it, and to protect all from the chilling winds.

By doing a little at a time, by adding one improvement after another, every farmer may in a few years create around him scenes whose beauty alone would amply reward him for all his labor. A garden thus formed by degrees is more satisfactory than one produced at once by a large outlay of lar money. The pleasure of creating it is prolonged, and the expense b little at the time, is not felt. In this way, also, new flowers, vegetables fruits are added from time to time, each giving a fresh pleasure and new

A garden is one of the most fruitful sources of instruction to the y. The farmer can here bring his children, and speak to them of the wisd skill and benevolence of the Creator. He can dissect flowers, plants, seeds, and show their curious structure, and how wonderfully nature has vided for their preservation. This is one of the fine arts which the farmer cultivate; and while he is gratifying the love of the beautiful which nature given him, he is also improving his intellect and his heart. The mere all to this subject will suggest a multitude of pleasant thoughts.

The farmer needs recreation, and where will he find it better than in his garden? Time spent there will make him fonder of his home, and keep him from temptation. Many young farmers might have been saved from ruin if they had early commenced the cultivation of a garden. The public need to be urged to give more attention to this subject. Every man of taste and intelligence should seek to interest his neighbors in it, especially the younger portion of them. In this way communities may be influenced, and beauty, which shall increase our attachment, be added to our beloved land. Garden culture will surround our homes with associations of beauty, and with memories of pleasure and joy that will go with us wherever we roam, and never forsake till we lie down to our final repose in the bosom of the earth.

FLOWERS IN THE GARDEN.

Everybody likes flowers. Thousands of persons who are not farmers read this volume; many of them intend to be farmers some day, earnestly interested in all that pertains to rural employments. They are ive business men, with intelligent families partaking largely of their t for country life, and, not enjoying that, are beautifying their town or city n with such fruit trees, shrubbery, and climbing plants as their narrow will permit. Our suburban towns are annually made more attractive by the taste for the beautiful, and something of it is finding its way into the country, where grim labor has heretofore held undisputed dominion.

The love of flowers and the cultivation of them is an evidence that true and pure sentiments are in the heart; that a love for the beautiful has dawned there, and that the elements of progress are at work. One would scarcely love flowers merely because they look beautiful. He who could go no further than this would hardly have perception to go even as far. But when he breathes their fragrance, and witnesses the manifestations of God's love and wisdom in

cture and growth, then, indeed, are deeper and holier sentiments
g the love of flowers. The care and culture of them elevate and
: mind, and give the dusty walks of life many a charm that cannot
where they are wanting. They have a refining influence on children,
) soften and polish their manners, and to inspire them with cheerful
ife.

a law of our being that we become attached to those objects upon
have bestowed labor, and on which we have expended care. We
rees our own hands have planted, the vines we have cultivated and
'er our doorways, and over the trellis our own hands have con-

ted flowers are evidences of high civilization; they are a sort of
mometer, indicating in some degree the intelligence and refinement
)ple; and their indications are as significant as are the evidences
y architecture, painting, poetry, or any of the sciences. The lessons
'entle teachers are having an influence on the habits and manners of
:. In a recent journey over a broken and unattractive country, I
ny unpretending dwellings graced with a variety of beautiful flowers.
ıd phloxes opened their showy blossoms in the sunshine, and made
ırds bright with their beauty. The modest nasturtiums kept nearer
d, and spread their flowers of various colors wherever a stream of
)uld find them. On the gate-posts, in flower pots, and even in rude
:ssels, trailing plants were growing, hiding blemishes wherever they
making the dwellings a thousand times more attractive than they
:rwise have been. Where there were flowers I thought I could see
: about the buildings; an air of tidiness, thrift, and comfort, and bet-
; generally; and when I entered the dwellings I found the families
, comparatively refined, and not unfrequently imaginative and poeti-
ıge as the assertion may sound to some, it is nevertheless true, that
st two qualities were more generally prevalent and cultivated on the
would tend to keep thousands of farmers' sons and daughters from
he old homesteads.

)ve of flowers is the love of nature in detail; it is a union of affection
aste and natural piety." Flowers are the steady, impartial friends
hey gladden the sick room, and cheer the dusty way of the weary
The bright golden-rod nods over the wall as he passes, and the
ter or queen daisy peeps from the thicker foliage. The ancients
ıe altars of their gods with flowers. So the curled clematis forms
the wayside, and is called by the country people "Virgin's Bower."
d of the young maples and alders with its clasping tendrils, mounts
of the surrounding foliage, and covers it with its gossamer-like blos-
ıe French truly call it the "Traveller's Consolation."

tivation of flowers and a better knowledge of them will not only
)py but an enduring influence upon our people. It will affect the
of our farms and homes. Instead of uninclosed dooryards, where
: and gabbling geese are at home, and old wheels and rambling wood-
the house in dire confusion, while huge dogs, grim as Cerberus,
doubtful way to the door, there will be white palings enclosing a spot
' fruits and blossoms that blush in social sweetness on the self-same
These will not only attract and please the traveller, but will give
ı advanced money value through associations of intelligence, refine-
taste. Children reared in such a home will go forth into the world
: those sweet affections that soften the harsher aspects of life.
they travel, or trade, or sojourn, they will look back to the old
, among whose friendly trees and flowers they passed their early

years, as the dearest spot on earth, and one to which every lingering affe will constantly turn.

Our people do not yet fully appreciate the power of garden employm restore health, to bring back strength and equanimity to a distracted m to wean it from deep sorrows occasioned by bereavement. A lady wrote several years since, saying that in the autumn she met with a severe dom affliction. A long, dreary winter passed, and knowing, as she well did, occupation gives relief to a mind distressed, she resolved to commence the tivation of flowers. Her husband provided a suitable spot in the midst o rich vegetable garden, in which she placed a few varieties of pinks, some mon roses, and a flowering almond. Everything she placed there g throve finely, and the cultivation of this little spot became a source comfort. The next autumn she set four tulip bulbs, and in a few y had more than two thousand tulips in blossom in one season. There were twenty-seven varieties; and, besides these, she had all the bulbous root are usually grown in our climate, more than twenty sorts of roses, and almost endless variety of annuals and perennials. She said the pleasure derived from tending the garden amply repaid her for all the labor b upon it. I give the closing part of the letter in her own words:

"I am a farmer's wife, and not without an abundance of in-door employment; but my garden is my relaxation from labor. Money would not tempt me to part with it. From the earliest crocuses and snowdrops to the latest autumn flowers, it is one continual pleasure. I will add, that since I commenced gardening there have sprung up about our dwelling trees bearing most delicious plums, cherries, and pears, vines laden with the juicy grape, and strawberries and raspberries, too, have each their place in some favorable spot. I would not willingly exchange my home for what it was before we cultivated fruits and flowers, and I believe any one owning even a small amount of land can, without being poorer for it, afford a little spot for ornamental gardening."

The care of flowers will soften the poignancy of grief, and heal sorrows that no medicaments of the apothecary can cure. God's sunlight and pure air, the fragrance of unfolding flowers, the freshness of the soil, and free exercise among growing plants in the garden, may give health and life when all other means fail.

Few dwellings are so circumscribed, and few persons so involved in care, but room and time may be found to set a few climbing plants that will soon change the whole aspect of home. The scarlet trumpet honeysuckle, the yellow trumpet monthly, and the evergreen monthly honeysuckles, are hardy and beautiful climbers for the pillars of piazzas, summer-houses, porches, and trellises. The Chinese twining honeysuckle is another, growing remarkably fast, flowering in June, and very fragrant.

The purple or crimson Boursalt rose is quite a wonder of beauty in the l part of May, being then literally covered with blossoms, and it is so hardy scarcely a branch is ever injured by the cold of winter. The Queen of Prairies is a superb variety, and known by some as the Michigan rose. flowers are of a deep rose color, with a white stripe in the centre of each p it is the most luxuriant grower of its class, and is as hardy as an o blooms after the summer roses are gone. The Baltimore belle is another per fectly hardy rose; the flowers are a pale, waxy blush, almost white, ver double, and in large clusters.

The Virginia creeper, or American woodbine, is a hardy, rapid grower, an is exceedingly ornamental. It is a native of our own woods, and climbs rock and trees to a great height. The flower is of a reddish green color, and is no showy, and is succeeded by clusters of dark blue berries, which are nearly black when mature. At the same period the fruit-stalks and tendrils assume rich crimson or red color. The leaves are not evergreen like the ivy, yet in the autumn they far surpass that plant in their rich and gorgeous tints. It i the most ornamental plant of its genus. It flowers through July and A

of it in his work on the "Trees and Shrubs of Massachusetts," 78:

variety of rich colors, shades of scarlet, crimson, and purple, which the leaves
is plant assume, and the situations in which we find it, climbing up the trunks
itself along the branches of trees, covering walls and heaps of stones, forming
s from tree to tree, or trained on the piazzas of dwellings, make it one of the
ous ornaments of the autumnal months. Often in October it may be seen
arlet and orange leaves thirty or forty feet from the ground with the green leaves
hanged tree on which it has climbed."

surpasses this plant for covering a rustic summer-house, such a
ner and his son could construct in a single day. It is so tenacious
that a child may tear a root from the ground and carelessly place
il again, when it will grow with surprising vigor. How many
llings might be crowned with this beautiful ornament and made
heerful at a trifling cost of care.

ht hardy and ornamental climbers of which I have spoken would
ter to any place, even one of considerable pretensions, and any
· of them would render our gardens and rural lawns highly attrac-
require no uncommon skill in their cultivation; the soil that
ce a good hill of corn will sustain any of them.

hat the garden should retain its beauty and attractiveness through
here should be a succession of flowers, and a very few, judiciously
l afford a pleasing variety. Bulbous flowers must be selected for
bloomers; other herbaceous perennials for their successors, and
lar bulbous plants and annuals for late summer and autumn flower-
arliest bulbous flowers are the snowdrops, single and double,

> "Who, in habit white and plain,
> Come as the heralds of fair Flora's train."

is, hyacinth, daffodil, or jonquil, and early anemone, all appear
on as the snow is off the ground. These may be followed by the
adonis, wood anemone, pansies, primroses, and the numerous and
ieties of the tulip, and many others. After these there is a rapid
f herbaceous perennials, some of the finest of which are the veroni-
, lupins, the iris of many sorts, columbines, poppies, and the mag-
eties of the herbaceous peony.

e most interesting summer flowering bulbous plants are the "*Gladi-
is*," or common purple sword lily, which is perfectly hardy; the
oribundus, or profuse flowering sword lily, remarkable for its beau-
olored flowers; the *Gladiolus gandivensis*, or Ghent sword lily,
of a rich orange scarlet; and the "tiger flower," remarkable for
etals, blooms about the same time; so do the splendid double-
ollyhocks. The Japan lilies are more showy and quite hardy.
wers are obtained largely from the successful culture of annuals.
nthemums flower almost into winter. They are hardy and will
ted in open ground with a shelter and full exposure to the sun
tter part of autumn.

many flowering shrubs that are hardy and of great beauty. The
on blooms before the leaf starts, and sometimes before the snow
all disappeared. Several of the spireas, the wax plant, Chinese
, strawberry tree, lilacs, and viburnums are all beautiful and easily

y call attention to the great variety of charming wild flowers of
. They are among nature's most beautiful productions, and by
ess and fragrance will well repay any care and attention given

There are many other flowers which the amateur would intro garden, but I have referred to a few only of the most beautiful merely u the beginner that his labor will be rewarded, even in the first season, n delightful work.

In what I have said of fruit and vegetable gardens, as well as of my aim has been not so much to show how they can be produced as to e in the mind of the reader a taste, desire, and love for the occupation. Mr. Colman was abroad on his agricultural tour he wrote:

"I have said and written a great deal to my countrymen about the cultivation of flowers ornamental gardening, and rural embellishments, and I would read them a homily on subject every day of every remaining year of my life if I thought it would induce them make this a matter of attention and care. When a man asks me what is the use of and plants, my first impulse is always to look under his hat and see the length of his I am heartily sick of measuring everything by a standard of utility and profit, and do I pity the man who can see no good in life but in pecuniary gain, or in the n indulgences of eating and drinking."

In no other way can so much real beauty be created, so much render home healthful and attractive, that will awaken in the mind c emotions, and fix the memories of early life so indelibly upon the heart, as cultivation of fruits and flowers about our dwellings. Downing says: "A cottage in the country too rarely conveys the ideas of comfort and happ which we wish to attach to such a habitation, and chiefly because it bleak, solitary, and exposed to every ray of our summer sun. How dif such edifices, however humble, become when the porch is overhung with ing plants, when the blushing rosebud peeps in at the window, or the purple clusters of the grape hang down about the eaves. And with very care or expense all these charms may be added to almost every h towns and villages." The little boys and girls of the family may do work this change, if the desire exists in their hearts, and to awaken such a desire is the object of this paper.

HOUSE PLANTS.

BY RUTH HALL, OF CHICAGO, ILLINOIS.

"Encourage the beautiful; the useful encourages itself."

THE cultivation of house plants has a refining and quieting influence on families where they are grown; they adorn the house as nothing else can, and give to the cheapest furniture an air of elegance which no other ornament can impart. And the influence of flowers is not confined to the house or household where they are cultivated: they are a most graceful form of charity to the poor passer-by who has no means of gratifying his taste for the beautiful. To him blooming flowers, surrounded by their leaves of different shapes and even when only seen at a distance, through a parlor window, give a pure pleasure which those more accustomed to such gratifications can scarcely preciate. It is impossible to overestimate the effect of youthful asso and daily companionship with such exquisite shape and coloring, which in the minds of children a taste for simple and natural forms of amusement recreation.

Henry Ward Beecher declares that he has always found house plants a infallible test in selecting acquaintances, neatness, cleanliness, and inn

e usual accompaniments of a love of flowers. Then, what de- of gossip they furnish; and how many reputations have been use plants were at hand, with their various merits, their growth, lture to be discussed! How they grow into the affections, too, ir green sheaths pierce the rich brown mould, and leaves and ling into loveliness! Especially is this the case with early such as the crocus and snowdrop; and still more dear are those r and fragrance are united, as in the different species of hya- e raised and petted with tenderest care, every hair-breadth of nd the unfolding and display of coloring commented upon with ıtion.

for those, neither rich nor poor, who dearly love flowers, no ıeeded for their cultivation; only a little room, and light, and ı to fill parlor and dining-room with these lovely guests. It is very ɔmmon pine box fitting the window, and filled with mignonette, so that its perfume may be shed over the feast at Christmas; st and most rustic-looking flower-pot, especially for hanging nade of a flat winter squash, with the seeds scooped out, and nade filled with leaf soil. The *Cyclamens persicum* is a beauti- ıent not surpassed by many summer flowers; its waxen petals, purple spot, seem hovering like insects over the dark green . basket of moss and *cyclamens* is quite a fairy ornament, and blossom from November till April, all the care required being ng with slightly tepid water.

ıuch prettier for the roomy parlor of a farm-house, where the ɔ not too pretentious to harmonize, than a stand of light rustic th thrifty, well-grown plants, fringed with growing moss or fern. plants there are none which better repay the cultivator than t is perfect in itself, is a beautiful contrast with foliage plants, s variety of colors, is admirable for vase or pot culture, and, nanaged, will bloom profusely from January to May, the very e solace of flowers is so ardently desired. Dexter Snow, the ıd skilful cultivator of the verbena in this country, says that to essfully, whether in-doors or out, they must be fully exposed ey will not thrive without it. When grown as a house plant placed near the glass, where the sun may reach them the the time. Give them a good airing each mild, sunny day, by g the window for an hour or so; this is quite indispensable to tocky growth of the plant. The temperature of the room in he flowers should average about 60° in the daytime, and 45° ı temperature after dark causes the flower to grow weak and the plants only when actually necessary, and then do it ing care to pour off what falls into the saucer. Shower them keep them clean and free from dust. In all cases use rain- plants. Fumigate with tobacco as often as the green fly ap- ıy be done by throwing a handful of tobacco on a dish of coals e plant-stand; or, to avoid the smoke in the sitting room, set group on the kitchen floor; place a few chairs around them, w an old quilt or carpet; let it reach the floor, so as to retain ɔe the coals and tobacco underneath, but not so near the plants n. Ten or fifteen minutes' smoke will destroy all the insects.

· for the verbena the sulphate of ammonia is excellent, giving lark green, luxuriant, and healthy appearance; it is economical, applied. Prepare it in the morning before using, by dissolving ammonia in two gallons of water. It may be applied once a y. A good fertilizer may be made by dissolving one pound of

guano in ten gallons of water, letting it stand twenty-four hours before Apply once a week. Ladies keeping canaries, and emptying the bath on these plants, will find it act like magic on their growth.

The crimson passion-flower is the most showy of all its class, an effective among other plants. It must be placed in a large pot of rich co which should be sunk to the rim in an open border early in summer. grow ten feet the same season, and bloom profusely by the first of autu is, however, more properly a green-house than a parlor plant, and must turned to shelter before the frosts set in.

Although it may seem out of place to mention shrubs in an article on plants, I must be allowed to express my admiration of the double Japan s the leaves are so fine, and the sculptured, massive appearance of the rose-shaped flower so unique. The plant is hardy, and may be rap creased by layering the young, fresh stems early in summer. They will take root the same season, if the soil is kept moist.

A love of house plants is so common to female human nature that there few exceptions to the general rule. It is singular what little success atte endeavors of most people in this direction. "Some fail," says the G Gentleman, "for want of skill and experience, but more from want of a keep plants in." One great difficulty in the way of success is the dryn high temperature of stove rooms. Plants require a moist atmosphere temperature too low for the comfort of human beings. Rooms occupied family will not generally answer; for ordinary house plants, theref apartment should be selected which is exposed to the rays of the sun a the day, and without a fire, yet so situated as to receive heat from some when necessary. The temperature should never get below 40°, but be near 50° as possible. Care should be taken at this season not to overw plants. Many persons keep the roots soaked all the time. There is l ger in their being too dry than too wet. No definite rules can be laid d to the frequency of watering or the quantity to be given; but the soil not be allowed to get so dry as to cause the plants to wilt, nor kept so to have the roots constantly soaked. In sunny weather daily water in be given; in dull, cloudy weather perhaps once a week will be sufficien

Plants that are in a state of rest absorb very little moisture, and, th should be very scantily supplied with water, while those that are in ac constantly absorbing and throwing off moisture, and should have s water to supply the demand. Frequent syringing of the whole folia service; but when this cannot be done conveniently, the washing of th with a sponge will be found beneficial.

When plants are taken up out of the border preparatory to being p is necessary they should be well cut back, or, in plain words, the shoots be shortened. If this is not done, the plants will have lon, -nd s shoots instead of vigorous young growth.

First in beauty as a house-plant stands the Camellia japon..ca, whic rally begins to bloom in January. These magnificent floral treasure not be so rare among amateur gardeners were it not supposed they difficult of cultivation. This is a mistake. The writer has never know to bloom more luxuriantly, with such profuseness, and, withal, so fi stain or blemish on the waxen beauty of the flower as in an ordinar window. This window had an eastern exposure; a common wood-st the only means of warming the room, and the precaution of a newspap window at night all the extra care; yet these gorgeous blossoms, va hue from pearly white to deep carmine amidst the abundance of glos leaves, drew the attention of every passer-by.

This plant is retiring in its habits, and as fond of shade as the moderate coolness during its period of rest being absolutely necessary t

ts worst enemy is the red spider, whose ravages, if not speedily prevented, ·ill prove fatal. If its attacks have reached a great extent the leaves are ownish, having an appearance of decay, or of being scorched by the sun. n taking hold of the leaf it feels soft, and seems to have lost its nutritive sub- :ance. When the young foliage expands it becomes covered with dark brown pots, is very much disfigured, and ultimately death ensues. If any of the lants seem thus affected, take a sponge and wash every leaf minutely with oft water, and syringe them three or four times a week, which will keep them lean. All the young foliage will be healthy, and that which has been affected ·ill fall off. However, prevention is better than cure, and if the camellias are roperly syringed every evening during summer, and once or twice a week rough the winter, they will never be subject to the ravages of that destructive sect. In case of accident, tie up to stakes any of the flowers that have ex- anded, and in syringing observe not to let any of the water fall on the flowers, s it will cause premature decay and loss of color.

There are about eight distinct species of this plant known in our collections nd the varieties of japonica approach one thousand, to which many are added early. So rapid has been the increase of varieties in Europe, and even in is country, that in many instances three or four distinct plants have come ut under the same name; consequently great confusion has resulted. The ollections of this country were kept comparatively pure till within the last few ears, or since the anxiety of our cultivators to obtain variety caused them to nport from the French and German markets. In this article we cannot do re than glance at the choicest varieties.

C. alba-plena, common double white, is admired by the most casual observer, id generally considered a very superior flower from the purity of its white- and the abundance of its large blossoms, which are closely and regularly et with round petals. The foliage is large; the plant grows freely. We have een one shoot grow two feet in a summer. The white camellia was imported nto Europe from China among the first of the varieties, about eighty years go, and is magnificent.

Amabile.—This exceedingly perfect flower is regularly imbricated; the ex- reme petals are bright rose, shading to delicate pink, and in the centre light ed. The plant is full foliage, and of excellent habit; flowers about three nd a half inches in diameter.

Versicolor.—Perfectly double; color vivid red, with occasional splashes of pure white. The flowers vary, and are often only red; they are of long luration—from six to eight weeks; foliage large, and dark, glossy green.

Lady Hume's Blush, by some called *buff*, is a very double flower, beautifully egular and imbricated, frequently hexangular or star-like. The bottom of the petals is most delicately tinged with blush, and the centre has the appearance f rose-colored vapor. It is a great favorite, and most deservedly so. It wers and grows freely; foliage rhomboid, elongate; nerves very visible, face smooth and pale green; distinctly seriate, and grows strong and erect.

Madonna, the last variety I shall enumerate, is a very pure white, delicately iped with bright rose; perfectly imbricated and above medium size; foliage k shining green.

Monthly roses in all their varieties form an exquisite contrast to the dark, firm foliage and sculptured perfection of the camellia. They seem almost the exact posite, with their ever new shoots of fragile leaves on their graceful curving . In the olden time no collection of plants was considered complete without the rose. Monthly roses are easy of cultivation with a good frontage, derate warmth, and but little moisture except when flowering freely.

In the garden, of course, roses are indispensable; and in the garden or the none are more popular than the tea rose. As this species require more

Yellow Tea, pale yellow color, cupped, petals very large, and, a
semi-double, has not a rival of that color. It is a strong grower
tender than any tea rose of its habits. A fine plant of this kind
stand is a rather rare as well as an exquisitely beautiful ornament.

The white musk-scented cluster rose is one of the oldest inhabit
rose garden. It is supposed that this is the famous rose of the Pe
Although there are several varieties, very few have the peculiar f
the old sort.

There is a very beautiful plant, but seldom seen, which should h
in every collection. It is known as Maranta Zebrina; is unique in
having large, elongated, ovate leaves, beautifully striped with gree
purple, and is called by some the Zebra plant. It has light blu
ovate spikes about the size of large pine cones. It is an herbaceou
even in the warmest part of a hot-house retains its splendid foliage.
a very liberal supply of water.

Of course the Calla is never wanting in a collection of house pl
Ethiopian is the most admired for the cool purity of its large wi

thhold the accustomed supply of water, keeping the plants in a half
Even when growing they must not be overwatered, as they are likely
m moisture. Keep them in partial shade during the summer months.
time for potting either of the sorts is when the crown of the bulb
protrude. If the roots are becoming large, they may, every alternate
cleared from the old soil and put in smaller pots with the crown
ıbove the ground.

ılants are accustomed to cover themselves with leaves, and it is well
:d now that the plant, properly speaking, consists only of stems and
ll other parts, as buds, flowers, and fruit, being only modified forms of
. Plants, therefore, are mostly green, and the depth of their color is
ion of their healthy action. But there are hundreds of shades, each
y contrasting with the background against which the plants appear
ble and beautiful moss, in its several feathery varieties, shines with its
emerald green on the dark sides of rocks, whilst mushrooms display
geous scarlet and orange between the sombre, rugged roots of the
er whose shadows they love to dwell. The glossy ivy looks all the
erful from the contrast with the gray, crumbling ruin which it drapes
ıl green.

lants are greedy consumers of water, and know how to obtain it by
uliar, and as yet unknown process. Even in the tropics, where for half
no cloud darkens the sky, and where not even dew is given, they
nough to sustain life and vigorous growth.

are few plants more remarkable than the different species of Cactus.
:annot be claimed for their large, fleshy, uncouth leaves, thrust here
: with the greatest apparent want of order, yet their suggestion of arid
ıd tropical sunshine is not unpleasant in contrast with the flexible
ıd stems of many of our household favorites. The flowers are usually
:nt in coloring and transparent in texture; so, also, there is a never-
ariety of hideousness in the shape of the stems, some dropping down-
ake-like in form and color; others, such as the newly discovered
hich returned explorers from Pike's Peak have introduced to notice,
ıg an old-fashioned straw bee-hive. This family of succulent plants
:ably tenacious of life, as is proved by some varieties retaining their
for years in a hot, dry atmosphere, without receiving a particle of
except what they might absorb from the air. This is owing to their
ıtructure which allows them to exhale damp very slowly, as they have
r leaves. We know no other plant so peculiarly adapted to growing
, or which repays so abundantly the trifling care required in culture.
e regretted that so little attention is paid to this interesting class.

)ecies and varieties are very numerous, amounting to several hundreds,
nto many genera, some looking like flat, prickly cakes of green wax
ge and joining each other irregularly. The *Mammillaria*, called the
us, has spines clustered around a small tubercle; the *Cereus* has, for
part, long, pliant shoots; the *Epiphyllum*, stems resembling leaves.
:e all curious; connoisseurs declare many of them beautiful. They
ıdure frost; the slightest tendency to freezing kills them. There are,
a few hardy species; among them is the Prickly Pear, belonging to
ıs *Opuntia;* its flowers are yellow, like most others of this class.
this plant will grow in nearly pure sand, it does best on good soil. A
ıpost is made thus: equal parts of rich loam, decomposed manure, and
ıd; mix and always keep in a dry place ready for use. One of the
nts is to adapt the periods of growth and rest as near as possible to
s of the plant in its natural condition. When growing, water freely,
very little when at rest.

For all practical purposes the cacti may be divided into two classes, v
blooming and summer-blooming. The time of flowering may be s
varied by culture, but it is best to follow the natural tendency of the
Those who can, had better purchase their specimens while in bloom,
they are acquainted with the varieties. As soon as the plants have
flowering, take them out of the pots and crumble off half an inch or so of
soil around the ball adhering to the roots; then put them into vessels abou
inch larger than those from which they were taken, having plenty of bits o
broken bricks in the bottom for drainage. Give them a little water,
enough to settle the soil around the roots, and moisten them not more
once a week thereafter. Place them in a warm situation where they will
plenty of air and light. When they commence to grow, water twice a w
or often enough to keep the soil damp, not wet. Syringe, to keep
clean.

In summer the plants may be set out of doors, placing them on boards or
flat stones; and if pure sand surrounds the pots, it will be of great service in
protecting the roots from the direct rays of the sun. Remove them to
house before a suspicion of frost, giving to those that are not prepa
flower only sufficient water to prevent them from shrivelling; those that
a reddish tint around their buds should have a regular supply. Tempe
should be from 60° to 75°, or even warmer, but make no sudden t
from heat to cold, or the buds will blight. When cuttings are taken on
should be placed on a shelf in a dry place, and left there for one or two w
before potting. This causes them to lose part of their watery substance
they take root more readily. Put them in soil composed of at least hal
and give but little water till rooted.

The most common, but not for that the less lovable, of house plants
geraniums. Leigh Hunt, whose taste was indisputable, said, if one have a so-
itary plant, let it be a red geranium. They are clustered round with s
tions. Everybody recollects the horseshoe, the rose, and the fish
from earliest childhood. To many the sight of them brings back the old
stead, where, in a deep, well-sheltered window, these pets of "mother, or s
or maiden aunt" made perpetual sunshine.

About the first of August geraniums require a complete dressing. Collect
them all together, and with a sharp knife cut off the wood of this year to wit
a few eyes of the wood of last year. Citriodorum and its varieties do not
pruning. Plants grown from cuttings, and that have flowered during the
son, may be cut to about three inches from the root. Choose a cloudy day for
the operation. Turn the plants out of the pots, reducing the ball of earth so
that the same pots may contain them again with from half an inch to
inches of fresh soil around the balls. Carefully press them in with the p
stick, and finish by levelling off neatly with the hand. Give very
waterings from a rose-mouthed watering pot for a few weeks, until they
to grow. The tuberous-rooted and deciduous species must be very mo
supplied. Be careful that the new soil does not become saturated, for,
allowed to dry again, it will not be so pure. When they grow afresh, ex
them fully to the sun, turning them regularly every two weeks. Th
these shrubs bloom in the green-house the whole winter, their usual t
flowering is in April. "Flower of the Day and Queen of Summer are
the best varieties." The strong kinds will be growing very luxuriantly,
require liberal supplies of water.

The veronica is a very beautiful plant, almost a shrub. Its greatest charm,
notwithstanding its spikes of purple flowers, is its glossy foliage. The Ander-
sonia, opening blue and changing to white, is in flower from August to Christ-
mas, requiring only the simplest culture, and growing freely and symmetrically.
No flower stand can be considered complete without at least one specimen.

A choice collection of the Chinese azaleas should be in every green-house They are easy of culture and bloom freely from February to May. The pots ust be well drained and shaded from the sun during summer, while the tops the plants are fully exposed to its rays. It is found that by such treatment hey are every year completely covered with flowers, and grow more stiff in abit than when the whole plant is shaded. They should be repotted as soon they have done flowering.

The wax plant, scientifically named Hoya, is a curiosity in its way. There re about twenty species, all of them climbers, requiring plenty of heat and ittle water. The leaves are green and fleshy; the flowers are mellifluous, ive-parted, and in pendulous bunches, slightly bearded, and have every appearance of the finest wax; their color a beautiful blush.

The heliotrope, whose fragrance exceeds that of most other flowers, lays no laim to beauty. Of the twelve species all are scented, two of them most remarkably so.

Among the most beautiful of floral ornaments hyacinths rank deservedly igh, and few flowers more richly reward the cultivator for the little pains cessary to their successful culture. A very tasteful arrangement of these ith the bulbs is common in Germany. Single hyacinths, together with cillas, snowdrops, crocuses, and other small bulbs, are placed in shallow lishes—soup plates if nothing better offers, though, of course, glass dishes are nore elegant—arranged in any form to suit the fancy. The roots spread out nd intertwine until the flowers rest on a network that keeps them in their laces. Having selected the species, place a foundation of charcoal, and on his a layer of damp white sand. Set the bulbs a little distance apart, and remove the dish to a dark room, where they may remain for about three weeks. This treatment encourages the roots to form plentifully before the buds appear. At the end of that time a little water may be given by pouring it down the ides of the dish, and if the roots are pushing the bulbs up out of place, pour ry sand over them till they are covered. When the blossom buds and the eaves have made a little growth they should be brought to the light of a window, and in all respects treated like those in glasses. Dwarf hyacinths are est for this use, the bulbs not being much larger than a walnut.

A London seedsman advertises in his list "miniature hyacinths," which, on ood authority, are said to be perfect gems of beauty, especially for winter ouquets, the larger sorts being too stiff to be used for that purpose.

PLANTS PROPER FOR WINDOW CULTURE.

As plants for windows are to be differently situated with regard to place nd surroundings from what they are in their natural state, it becomes necesary to select such as are capable of accommodating themselves to circumtances; and as the circumstances unfavorable to plants are want of pure air and ight, and uniform temperature, these must be kept in mind in the selection; he latter especially must be considered in regard to those species which are ccustomed to long seasons of rest in the winter. Rooms in crowded cities are he most unnatural, and on that account the very worst situations in which ants can be placed; and therefore, if healthy shoots, with abundance of loom, are sought for, variety must be sacrificed.

Plants which continue healthy for a long time in the confined air of rooms generally those which have a peculiar surface or texture in the foliage. uch are many of the aloes, cactuses, mesembryanthemums, among what are d succulent plants, and in a higher temperature some of the curious order rchidaceæ.

The reason why the succulent and epiphytous plants answer so well for e culture is that their winter is one of drought, not of cold, and the latter ecially have little and some of them no mould at their roots in their natural

condition. But there has been generally a prejudice against and a w
attention to the culture of succulent plants. This is unwise, for many of t
are exceedingly beautiful, highly fragrant, and better adapted to house
than any others. They are singularly curious and varied in their str
and, generally speaking, require less light, air, and moisture than other

Next to them, in point of eligibility for the home garden, may be rec
such as have coriaceous leaves—that is, their leaves firm, and with a
and compact epidermis—such as oranges, pittosporums, myrtles, and o
similar texture. These are found to have organs much better adapted to
fined air than plants with small leaves of delicate texture. The heaths,
in fact, the whole race of pinnate-leaved and papilionaceous-flowered
are unfit for house culture.

TREATMENT OF HOUSE PLANTS.

Water, heat, air, and light are the four essentials: water, heat, and
promote growth, and light to render that growth perfect. Three of
requisites man can command at his pleasure by artificial means, l
light there is less control. To be beneficial to plants light must come
from the sun; therefore it should fall upon them with as little as possi
that refraction and decomposition which it suffers when passing obli
through glass or any other medium except the air. Plants grown in the
air, and with such free exposure to light as their habits require, develo
their parts in proper form and color. A geranium placed in a dark room
comes first pale, then spotted, and ultimately white. Hence plants in r
should be placed near a window, which should, if possible, have a s
exposure, and never be shaded with blinds or curtains. If placed at a
from the window, the position of the plants should be frequently cha

Air is as necessary as light, but can find its way where light cannot;
fore requires less care from the cultivator. The heat of ordinary d
houses is quite enough for such species as we should recommend for
culture, except in very cold weather, when remove the pots from the w
Spring and autumn are the seasons when most attention is required.
plants are killed by the rapidity of transition from moderate warmth to cold
than by the frost itself. When, as will often happen, plants are slightly in-
jured by frost, cold water should be sprinkled on them before the sun shines
on them. Continue the application as long as any appearance of frost remains
on the foliage.

Water is as essential to the whole plant as it is to the roots. The stems
and leaves are liable to collect dust, and thereby be injured. Leaves are the
breathing organs of plants as lungs are of animals, and cleanliness is very
essential to their health; they should therefore be frequently syringed. The
pores are generally large in proportion to the size of the leaves, which is one
reason why delicate leaved shrubs are not so well adapted for the house as
those of larger and firmer texture.

Carnations are exquisite flowers for those who have sufficient accomodations
for the finer sorts. They should always be potted to protect them from heavy
rains. Refresh the tops of the pots with new earth in June, and keep the
plants free from decayed leaves. Gently stir the soil around each plant occa-
sionally, and as flowers in pots require more water than if placed in the ground,
let the carnation be gently moistened about every other day during dry
weather. Water them in the morning. No flower will endure drenching
during the heat of a summer day. Carnations love salt and sand in equal pro-
portions. Do not allow two buds to grow side by side upon the same stem,
for one will weaken the other; pinch off the smallest. They love warmth,
therefore give them a sunny aspect, and water them once a week with lime
water if they appear drooping; for this is caused by a worm at the root.

Let no one forget the claims of the great family of ferns. Many of the species are evergreen. They give a fresh, verdant appearance to the conservatory when gay summer blooms are past; or if grown under a glass shade or ample they form a beautiful ornament to the dwelling-house at all season The different kinds with which I am acquainted are remarkable for grace and legance of form. The large leaved brake is a very fine specimen; the leaves s almost entirely bordered by a thickened margin sustaining the organs of r tification.

Adiantum formosum and *acultratum*, two species of maiden hair, have the ossy black stems and delicate leaves so well known in the British maiden r fern; while the silver brake seems a reminiscence of the sea, with its slender, weed-like foliage.

A hint to mignonette growers will, I hope, be pardoned, even if it savors of epetition, for this modest flower, with its fresh, wholesome fragrance cannot be oo largely disseminated. It is sometimes sown in small pots for want of room; ut where space is no object, it gives less trouble and succeeds equally well hen sown at once in the pots in which it is to flower. Many complain that hey lose their mignonette in winter; this is owing to its being kept too damp. It should have little or no water for about three months during the dull season, d care should be taken to keep it from drip, which is sure to kill whatever lant it falls upon. When small pots are used, particular care need not be aken to have the soil very rich, provided it is light; but when sown at once in lowering pots, richer material should be used, draining well, and placing on the op of the crocks, in the bottom of the pots, flaky pieces of decayed manure for the louble purpose of affording nourishment to the plant when coming into bloom, and o keep the soil from choking up the drainage. Autumn sown plants shifted into ger pots at Christmas will bloom till May; and another sowing now will succeed nem, after which it may be had plentifully; and no amount can be too large n the open ground. Unpromising plants, if topped back about this time, come n nicely for winter boxes in May. Pots of them may be set among stocks, eraniums, or other dwarf plants, the box filled up with rich, light soil, and inished off with a good watering to settle the earth around the roots. Boxes hus arranged are beautiful ornaments for the window-sill; the geraniums or ther flowers giving brilliancy and the mignonette fragrance.

In its native country, Barbary, this fragile plant is a shrub and not an an nual, as with us. It should always be sown in a light sandy soil, as when own in a stiff soil it loses its fragrance. To obtain the tree mignonette, a rigorous plant from the common kind sown in April should be chosen, put into pot by itself, and all summer the blossom buds to be taken off as fast as they ppear. In the autumn the lower side shoots must be taken off, so as to form he plant into a miniature tree. It may afterwards be transplanted into a larger pot with soil formed of sand, and turf broken into small pieces. The lant should be kept in a warm room all winter, regularly watered every day, l in the spring the stem will begin to appear woody. The second summer ne same treatment should be observed, and the following spring it will have ark on its trunk and be completely a shrub. It may now be suffered to lower, and its blossoms will be delightfully fragrant; they will be produced very summer for many years.

Among the tenants of the plant-stand, a few specimens of foliage plants, or hose more dependent on their leaves than flowers for beauty, should find ace. First and foremost stands the *Cissus discolor*, whose charms are enanced by durability, remaining the same all the year round. Some of these val in the richness of their tints the most gorgeous flowers, and the species ove mentioned is one of the most marked. The leaf is heart-shaped, with indentations on the edge, and the rich velvet of its upper surface is inde- le. The centre rib and principal veins are marked by various shades

of purple and black; between the veins are patches of silvery white, towards the edge the purple softens into a delicate, subdued green, forming one of the most harmonious arrangements of color with which nature indulges us.

The rich, dark *auricula* is a plant of great beauty for window culture, and is too rarely met with, notwithstanding its claims on account of form and fragrance. Many who possess them fail of success, because they do not give the treatment required in order to make them perfect their bloom. These pl court the shade, and should be watered very sparingly until they begin to grow; never pour or sprinkle water on the foliage, especially before flower s moisture destroys that fine meal-like substance found on many of the varie which so greatly enhances their beauty. Only one stem should be allowe each plant; the first one that appears is usually the best. Connoisseurs in culture of these flowers desire that the pips should be large, flat, and r with ground color equal on every side of the eye, which should be quite ci lar, as well as the edge. The tube, a bright lemon yellow, perfectly round, an filled with anthers or thrum; the eye round and large, the body-color bl or violet, in green-edged flowers should be a whole one, not a shaded gr The stem long and sufficiently strong to bear the truss above the foliage– truss to consist of not less than five full-grown pips.

In September these plants should be repotted, to have time to become established before winter, which is the best season to take off slips, for two reasons: they do not want so much nursing through summer, which is the most precarious season of the year for these plants; and they begin to grow and will root afresh sooner.

There is a lovely little flower, seldom noticed, which is, however, worthy of any pains that may be required to bring it to perfection. It is called the *Notylia albida;* is very graceful in stem, deliciously scented, and beautifully formed, although its flowers are no larger than pepper-corns. From a few thin oblong leaves there droops a dense raceme of whitest flowers, perfumed like the lilly of the valley. Their black sepal is long, convex, pale apricot colored, very firm, being in all cases turned to the outside of the inflorescence. The flowers are not unlike fairy shells. The rest of the blossom is transparent white, except one little pale apricot spot at the base of each petal. Words, however, can give but a faint idea of this charming little plant which must be seen to be appreciated.

To have the lilly of the valley in flower about Christmas, the tubers should be taken up in the middle of November, or at latest the third week; they should be at least two years old; if older, all the better. Previous to potting it will be necessary to decide how they are to be disposed of when in flower. They are frequently placed in fancy wire or wicker baskets, and still oftener in ornamental vases. If it is intended to remove the tubers when in flower, our plan is to wrap a bit of moss around each, and then pack them away as closely together as possible in pots, or, what is still better, in mignonette boxes filled with light, porous soil. Insert them deep enough to have the soil cover the crowns. Over all place a good thick layer of moss to assist in keeping them moist; and lastly, pots or boxes of the same dimensions as those in which the tubers are planted are inverted and placed over them, to keep all dark, as darkness is essential to success. Then remove all to a warm pit where they can be supplied with a little bottom heat, which must be gentle at first, but may be gradually increased as the plants show symptons of active growth. In three or four weeks, more or less, according to the treatment they receive, they will be abundantly furnished with their exquisitely scented flowers. They may now be removed and transferred to vases or baskets; the moss in which they are enveloped greatly facilitates this work. If they are intended to remain and flower where planted, the moss may be dispensed with; otherwise the

nt is the same. In this way we yearly produce the Lily of the Valley at as, and keep up a supply of their lovely flowers all through the winter.
emeria is a genus of tuberous-rooted plants, with beautiful flowers, na- South America, and capable of being grown to a high degree of per- in the stove greenhouse, or open air, according to the species. The ich suits all the *Alstroemerias*, is a mixture of sandy loam and leaf or well-rotted dung. Of all the stove species, *A. ligtu*, with white and blossoms, is most difficult to flower; but by giving it abundance of water summer, and a strong heat in December, it will flower in February, plant will scent a whole room with fragrance like that of mignonette. owering, the plants ought to be allowed to rest for three months, during ime very little water need be given them. After this they should be l and encouraged to grow by giving them plenty of moisture.
Blue African Lily deserves a notice among house plants, for it retains es all winter. It requires a loamy soil enriched by manure from an old this should be loosely shaken down in the pot, but not pressed. The ants full exposure to the light, and plenty of water when in a growing Shift repeatedly into larger pots, taking the offshoots away every time tting, till the flower buds are formed. The plants are always very fore they flower, and, when the buds form, should be so placed as to enty of room and moisture; take care not to let water remain in a t state about the roots. Thus treated and kept in a green-house or oom, or even under a veranda, this plant will frequently send up a stalk three feet high crowned with twenty or thirty heads of flowers vill come into blossom in succession. When in flower it may be placed pen air, and forms a beautiful ornament for the terrace or the lawn. desired to have the Agapanthus flower when of comparatively small should not be shifted often, and when it is in the pots need not be so of a size; the bulbs may be divided and the strongest of the fibrous it off without injuring the plant or preventing its flowering.
Cape Aster is a pretty and showy plant for stand or window. The enus is easy of culture, hybridize freely with each other, and, when it l that they produce a great abundance of flowers, it is not wonderful y should be held in such general estimation. They are nearly hardy, always grown in pots, as they flower so early that in the open ground s would be liable to be nipped by the frost. They are grown in light, , and only require ordinary care in watering. This plant is propagated ding the roots in August by cuttings struck in autumn, or by seeds hey ripen in abundance. The seed should be sown in May on a slight and the young plants pricked out into small pots and shifted frequently the summer. If they are wanted to flower in December, they should in the green-house all the year, and will begin to throw up their flower a October; but if flowers are not wanted before April, the usual time, ay stand in the open air and need not be shifted more than three or nes during the summer; in October they may be put in a cold pit, they must remain just protected from the frost till March, when they in to send up their flower stalks. Nearly all the beautiful purple kinds eties of hybrids.
e are two kinds of mesembryanthemum which are called the ice plant; annual, the other biennial, and they take their English name from the obular blisters, which botanists call papulæ, filled with a soft watery which glistens over the whole plant and makes it look as though it vered with ice. The flowers of these plants are white, but there are vith pink or purple flowers. One of the annuals has clusters of a bright
The seeds of these annuals should be sown in a hotbed and the plants transferred to the open ground in May; they should always be

planted out in the open border, as they never flower well in a pot. Tl
ennial kinds may be grown either in pots or in the open air, but in th
case should be taken up and carefully protected during the winter, as
killed by the slightest frost. They grow best in sandy or gravelly soi
for the larger growing species may be mixed with a little loam; but
these, the poorer and more sandy the soil, the more brilliant will be tl
of the flowers, though the stems and leaves will become small and weal

All the species should be kept quite dry when in a dormant st
abundantly supplied with water when about to flower. The perenni
are propagated by cuttings, which should be kept dry for several da
they are put into the ground; when they begin to wither, supply th
little water, and they will directly begin to throw out roots. The
which these plants are grown should be well drained with cinders, an
out in the open air set them on a dry sunny bank.

THE VIOLET.

The genus contains upwards of twenty species; those most est
fragrance being merely varieties of the *Viola odorata*, or sweet violet
nists, also called the English violet from its being found in that co
its single or natural state as a wild flower. It is most fragrant and d
when in retired and partially shaded situations. The species best s
cultivation are quite double, and of many different colors. The mos
nent are the *Cærulea plena*, or double blue, and the Neapolitan; this last
larger than any of the others, of a beautiful lilac shade, and very fi
fumed. Besides these, are the white and rose-tinted varieties, both si
double. Other kinds which have a tendency to form stems receive th
lation of tree violets. These are comparatively rare, but the true "t
exceedingly beautiful and difficult of cultivation.

Many of the varieties will afford flowers at any season of the year
tions are favorable. They require cool weather, rather shaded, mo
tions. They flower in spring and fall, and can easily be retained
from October till the end of May by the simple help of a cold pit
tected in winter. For such purpose they require to be grown in so
spot during summer and transplanted to the pit in October; all the af
ment necessary being to shelter them from actual frost, and give adm
all the rays of the sun consistent with keeping out the frost; or they
potted and grown in a green-house, placing them in the coolest pa
near the glass as possible. They may even be made a window plant
not prolific bloomers in this situation as the atmosphere is usually to
them. The double kinds are propagated by offsets and cuttings; th
ones by seeds or either of the other methods. Except in the case of n
in the hands of florists, a simple division of the plant every spring will
cient, and give a large quantity, as they multiply rapidly.

Violets form very pretty edgings for parterres where the situatio
able, moisture and shade being indispensable. They will grow in
garden soil, but a loam or mucky basin will suit best. In pot cultur
loamy soil, with a plentiful admixture of the manure nature provides
in their own haunts, decayed leaves or vegetable matter. The *Viola*
of the woods blossoms only in the spring; the monthly habit has
tained by cultivation.

MISCELLANEOUS HINTS.

The management of plants in rooms is often found very difficult
want of proper light and moist air, though this latter may in a measure
ated by opening the window in front of which the plants stand whe

mstances will permit. It should never be forgotten that moist air is almost essential as water.

Another reason for the unhealthiness of window plants is, that they are wa- red irregularly. The mould should never become so dry as to crumble, but it happens so by accident, drench it well with water equal in temperature to air of the room, and as soon as this is done empty the saucer or the water l grow sour and rot the roots. It is best not to overpot the plant.

The proper soil usually is leaf mould or peat, and the pots should always be led nearly a quarter of their depth with potsherds; large lumps of charcoal ixed with the broken crockery will be beneficial.

Among the natural enemies of flowers may be named the green fly, which in- sts plants in general, and is to some species particularly destructive. They tack the young, healthy shoots at the point, leaving a dark, filthy appearance the foliage. Many remedies have been offered by various writers, each con- ent in his own opinions. Fumigating with tobacco is decidedly the most cacious.

The red spider is peculiar to a dry atmosphere, and its havoc is generally ob- us before it is arrested. With its proboscis it wounds the fine capillary ves- us of the leaves, and if allowed to progress causes premature decay. When ou notice this appearance turn up the leaf and you will see them run- g about with incredible swiftness. When very numerous they work thick eos on the under side of the leaf, and frequently all over it, forming a mass of lf dead leaves. The most effectual remedy is a thorough syringing, especially der the foliage. This done every evening will effectually banish them.

Thrips, another troublesome visitor, is an insect so minute as scarcely to be erceptible to the naked eye. They usually lurk close to the vein of the plants, nd often attack esculents. Viewed through a glass when touched they skip with reat agility. They attack the tender shoots or extremities, which become rown, shrivelled, and will rub to dust between the fingers. When leaves or ots are in this condition the green fly is not observed. Expel the thrips, and ember that to plants, as well as to human beings, cleanliness is necessary health.

A word may be said to amateur gardeners and others in favor of an insect ost of us have in childhood chased and eagerly caught, viz: the crimson lady- ird. How many of us have been surprised and disappointed to find that the eek little beetle had wings when she chose to use them. These beetles creep owly when in their perfect state, and are often found on the ground. They o no injury to plants either in their larvæ or perfect state, and when found on shrub they are seeking a spot to deposit their eggs. Instinct teaches them visit plants most infested with aphides, for it is on these noxious insects that ir larvæ feed; consequently their eggs, which are of a bright yellow, are al- ys found on the leaves of shoots, the points of which are covered by the green y. In France and Holland the lady-bird is considered sacred to the virgin; ence its name. Let all lovers of roses, especially, protect the lady-bird.

A few hints on the arrangement of cut flowers may not be out of place here. of the beauty of these floral gems is often lost through want of taste, when stiffly circled in a hand bouquet, ring after ring, with little intertwining , and no graceful form of tendril, leaf, or bud allowed to break the plate- ircle. To people not accustomed to look closely at causes which, in the s, form effects, it gives somewhat of a new sensation to observe any leaf, r blossom, or berry that we call one-colored, and see the infinite number of s and clouds and patchings up of tints that go to make it so. It is not by but by expression of color and shade that we have to measure; and s group, good and harmonious in itself, may be completely spoiled by being lied in number or increased in size—that is, by repeating the same flower g to the same group. Delicate shades, if many flowers are used, and

those of much deeper tone when the blossoms are few, and when the amidst which they are laid is dark, is a safe general rule, but a great deal pends on the shape and color of the glass and china accessories. The w Dresden china vases is so intense that the purest flowers would scarcely their whitest in them. Very light flowers, also, are likely to look darke less delicate by the striking contrast; or, if very thin and fragile, have their too much weakened by the intense white body. A quantity of green is, fore, the best fringe for such dishes, and ferns the most suitable of any tiny leaflet showing as it droops on the white edge. The whitest flowers ver generally have the sweetest perfume. It might almost seem as if in bri ones color had taken the place of scent. In all flower arrangements, wh for vases or flat glass dishes, it is better to put in the green first, gr working up to the required brightness, always remembering that the co had better lack a flower than have one too many, the object being to m graceful, refreshing, and suggestive picture.

For winter bouquets of dried flowers and grasses, nothing is more appro than a pasteboard vase suspended from an oak branch on which the acorn brown leaves remain. The vase may be made in any artistic form with o curved lip, and the exterior may be covered with moss, or pine cones var or a mixture of seaweed, small shells, and imitation branches of coral by twigs covered with red or black sealingwax. A little clean sand will allow of grouping the flowers to the best advantage.

A very pretty and inexpensive ornament may be made with pine c grass seed. Place a large pine cone in the mouth of a tall glass partially filled with water. Open the cone slightly and drop lentil or grass seed into opening. Water must be sprinkled over the cone as often as twice a day, in a short time the lentils will send up their small green shoots and cover cone. The scales are opened by placing them in any moderately warm pla for a little while.

Flowers may be preserved perfect in form and color, to be arranged in wreath or bouquets, and framed and glazed for parlor ornaments, by closely observin the following directions: Take the finest of river or lake sand, wash it so clea that water when flowing from it will be pure as if from a well; heat it ver hot, and while in that state mix it thoroughly with stearic acid in the propor of one pound of the acid to one hundred pounds of sand. Let it cool; take small common sieve and nail boards under the bottom to prevent the sand r ning through. Place sand enough in the seive to hold the flowers in po not covering them; then, with a sheet of paper twisted in the form of a or cone, carefully pour in the sand between, around, and over the flowers, co ering them about half an inch. Set them by the stove, or in some warm pla where the sand will be kept at about 70° Fahrenheit. When they have r mained long enough remove the boards from the bottom, letting the sand out, leaving your flowers preserved in perfection.

The greatest difficulty is to know when the process is complete, diff flowers requiring different time. Flowers with thick leaves and pet ns more than thin light ones. Seven hours are sufficient for some, while o require twelve, or even more. It is best always for a beginner to experi with a single plant at a time. When the learner has succeeded with a variety and noted the time required, others can be tried.

It should be mentioned that flowers for this purpose should be picked dry, say at midday, after the dew is off. Those most suitable for preserva in this way are flowers of delicate and fragile texture, as they are more re permeated by the heat than those with thick, heavy petals. The most blossoms may be preserved perfect, and are used with good effect in ro the wreaths. Ferns of every variety give the most graceful green, while glossy leaves, such as those of the myrtle or veronica add greatly to the l

ll, whether arranged in wreaths or bouquets for the frame. Very much, ever, depends on the skill and judgment of the manufacturer, and the taste which colors are contrasted. Sometimes a charm is added by the skilful of moss in filling the interstices.

very novelty which brings flowers and leaves nearer to us, domesticates as it were, is a blessing. Lovers of nature will welcome this charming y work of flowers, which, it is to be hoped, will supersede the enormities in ted monsters, all angles, when curved lines only are the lines of beauty. fords pleasant means of beguiling leisure hours, and is a source of gratifi- n while in progress, as from it spring many tasteful additions to the parlor ments, and graceful and valuable gifts or tokens of affection.

ie French, though they do not love their homes, as is the general belief, as as the English or Americans, are yet very fond of flowers, and indulge love for them to a degree of which we have no conception. They have nies and terraces near the roofs of their houses, covered with flowers and e, and often furnished with great taste. Some have young trees of lime, e, and elm, six or seven feet high, with wide-spreading branches, which as much shade as is wanted. There is also what is called a *berceau* at nd, neatly trellised over and covered with vines, in which there is a divan. is a perfect screen when the sitter is in the open air, and as private as n doors. Sometimes a window is left, and a curtain to drop as required. viary may occupy one end, uniting the charms of song and fragrance.

prevent littering the interior of the house by frequent carrying out and plants requiring fresh soil, or other attentions, a quantity of soil, with pots, , trowels, and scissors are kept in a cupboard-like box under a seat.

our large cities where gardens are rare, and, in many instances, impossi- uch examples might be followed with a harmonizing influence.

THE MANUFACTURE OF CHEESE

AS A

STAPLE ARTICLE OF EXPORT.

BY S. L. GOODALE, SECRETARY OF MAINE BOARD OF AGRICULTURE.

E importance of the dairy as a branch of rural industry is universally ded to be very considerable, but it is doubtful if its importance to a graz- ill country like much of New England and of the middle States is yet appreciated. Every district which can feed flocks and herds cannot equal facility and profit convert the same amount of vegetable food into products. Immense ranges, especially in the west, can make beef and n and wool cheaper and easier than they can be made in New England w York; but they have not the green pastures abounding in springs of water and covered with sweet, juicy, and continuous herbage; and the would have to ramble quite too far to be brought home regularly night orning to be milked, or to give a generous flow if they were. Taking nited States together, we are compelled to believe that the extent of sur- ich is well adapted to dairying is very limited compared to that upon grains, meat, and other staple products can be profitably made. It has

been asserted upon high authority that in no other way can so large a
of animal food be obtained from a given quantity of herbage as by the
and it is believed to be capable of demonstration that a good milch cow
nishes the most economical means known by which to obtain from our
the alimentary matters they are capable of yielding.

Concerning the comparative returns from the dairy and from the stall,
have not that definite knowledge which is desirable; nor can it be
except by carefully conducted and long continued experiments with
mals, and under a variety of conditions, accompanied with constant
scales. Such experiments few have the inclination, the time, the
the perseverance to conduct to reliable conclusions, and I am not aware
having been thoroughly carried out by any one. The inquiry has freq
been made of intelligent and observing farmers, how many pounds of
can be made from a good milking cow upon the food which would yi
dred pounds of beef if consumed by a thrifty farrow cow, steer, or ox;
have never found one who could give an answer apparently satisfactory
own mind. The first impression seemed to be, perhaps, judging from
market rates of each, probably fifty or seventy-five pounds. But the
question was pondered and observations made in respect to it, the more
are inclined to estimate it higher, perhaps fully as many pounds of butte
beef, or even more. This problem seems to have engaged the attention
first British board of agriculture, and Sir John Sinclair, its president, pro
with reference to the observations or investigations of the board, says: "
supposed that the same quantity of herbage which would add 224 pou
the weight of an ox, would produce 900 English gallons of milk." W
the live or dressed weight be here intended, or whether the measure is that
for wine or ale does not clearly appear. Suppose, therefore, in order to
the best show possible in favor of meat, that the weight meant is the
dressed weight, and the measure intended is the smallest measure in use.
then find a pound of meat esteemed to be the equivalent of four wine gall
or thirty-three pounds of milk. Milk, on an average, will yield one-tenth
its weight in cheese; consequently, if we assume Sir John's estimate to be cor-
rect, we can have three and a third pounds of cheese from the food which will
produce one pound of beef. If his estimate only approaches accuracy, it is
easy to account for the impression which so generally prevails in dairy dis-
tricts, to wit, that the dairy affords a very profitable mode of converting
vegetable food into money.

The only definite experiment I find bearing on this point is related by M. Durand, of Caen, in the "*Compte Rendus*," July 31, 1848. In the translation given below the French weights are rendered into pounds avoirdupois, and the measure into wine gallons of 23 cubic inches. He says:

"The cow and the ox on which our observations were made were of the Cotentine breed The animals, each about six years old, weighed, respectively, 1,232 and 1,199 pounds. The products of the cow and the ox were only compared from the first of May to the first of August. During this time they had such, and so much, herbage as afforded ample nourishment. Each day the milk was measured, and the ox was weighed from time to time. The milk yielded by the cow during May, June, and July amounted to 470 wine gallons On the first of May the ox weighed 1,199 pounds; on the 5th of June, 1,331 pounds; on the 15th of July, 1,463 pounds; and on the first day of August, 1,494 pounds. He had thus gained in the period of ninety-two days 295 pounds. This ox appears to have been a thrifty animal, seeing it gained three and a quarter pounds per day; and the reported yield of milk is not extravagantly large for a cow of the above weight, being twenty and two-thirds wine quarts, or about seventeen beer quarts per day; yet we find it to be four hundred and seventy wine gallons, weighing three thousand eight hundred and seventy-four pounds, and capable of producing three hundred and eighty-seven pounds of cheese. The gain in the ox was 295 pounds live weight, from which, if we deduct two-fifths for offal, we have a net gain of 177 pounds of meat against 470 wine gallons of milk. If we assume that the two animals consumed equal quantities of food, and were equally capable of converting it advantageously to the several purposes of meat and milk, we find two and one-fifth pounds of cheese to be the equivalent of one pound of meat."

e attempt a comparison between the returns from rearing veal calves, or
e up to the age of one and a half or two and a half years, we meet
e same lack of data by means of which to arrive at definite conclusions.
do no harm, however, to attempt an approximation. From the most
observations and experiments which have come to my knowledge, it
about a gallon of milk for each pound of veal sold from suckled calves
ght to twelve weeks old, and reckoning such carcases to bring five
r pound, we have a return of five cents for each gallon of milk con-
y them. It is difficult to make a satisfactory comparison between the
yielded by dairy products and those from the sale of calves of one and a
wo and a half years of age. The estimates of farmers of the cost of rear-
n to these ages vary greatly. I suppose much of the difference depends
way they set about the reckoning. Let one estimate the food and atten
en them at what they bring when sold in this form, and it would
that the cost of rearing is not large; by the same light, however, farm-
n unprofitable and undesirable business—plenty of hard work and
y. Let another charge the milk which the calf takes at 1½ or 2 cents
the hay at $10 a ton, the roots or grain and the pasturage and atten-
what they can be made to pay by using them for dairy purposes, and the
s up to a sum much larger than the probable price which they will
d when brought to market.

ing from the best data we have been able to obtain, the opinion is held
food which will make one pound of meat will usually make at least
pounds of milk, and, where really good dairy cows are kept, probably
five pounds. Assuming, then, only twenty pounds of milk to be the
nt of one pound of meat, we can have, if we choose, in its place, two
of cheese. Although the proportion of cheese to be obtained from milk
ble, depending on the amount of butter and casein which the milk con-
may be safely set at as much as one pound from ten pounds of milk.
case, I was credibly informed of its having been made from eight and a
unds; but nine and a half are usually required with average milk and
agement. So long, therefore, as a pound of cheese commands as much
as a pound of meat, it would seem that we may largely increase the
from our grazing lands; or, if we take the usual prices of meat as a
r our estimate, we may conclude that the actual cost of producing a
f milk does not exceed five cents; and if we can, without too large cost
ufacture, convert it into what will bring eight, ten, twelve, or fifteen
t must be a profitable operation. It is not supposed that mere economy
r induce people to restrict their diet to the single article of cheese, how-
tritious it may be, and that thus an unbounded demand for it should be
. But the shrewd farmer ever looks closely to the market value of dif-
roducts, and changes his crops as circumstances require. It is perti-
erefore, to inquire what is the market for cheese, and where and what
ely to be in the future, and how soon it may be so supplied that prices
ll below remuneration.

southern half of the United States and the prairie States west make no
never made much, and never will. Formerly a large amount went
Let us hope that in years to come it may require a much larger amount
retofore. Great as it was, the loss of that outlet did not permanently
erely depress prices. Since Sumter fell, cheese has advanced 75 to 100
t., and already is the effect of the progress made in subduing the rebel-
in the demand south. When in the Western Reserve, in August, 1863,
informed by a large dealer that the call for cheese from Cincinnati,
lle, and other places, to be sent south, was urgent, and so large as to
rices to some extent. Considerable quantities also go to the West
to South America, and to California. But the principal market abroad

is in England. In Great Britain there are thirty millions of inhabitants, or less, who consume a great deal more cheese than the same n Americans, and whom we can supply with manifest advantage to th ourselves. The manufacture of cheese has long been pursued there e sively, and the county of Chester has been specially famous for c It is said that not less than 200,000 cows are kept in this county alone the production of cheese, of which 14,000 tons are annually sold in Li alone. The northern counties of England and the neighboring coun Scotland have also been largely engaged in cheese-making. But the price of land is so high that few, if any, farmers in England can produce a gal milk at a less cost than sixpence sterling, equal to twelve cents of rency when exchange is at par, and considerably more now that gold u premium. Of course no dairyman there can sell cheese for less than of the milk and the pay for making it up. It is also a fact that meat Great Britain at much higher price than it does here; and British farmers their hands full, and more too, to make meat enough for home consump large quantities of cured meats, such as beef, pork, and bacon, being annu imported. What reason, then, can be imagined why we may not furnish all the cheese required with mutual advantage? Our facilities are such we can make it cheaper than they. There is no difficulty in sending it thr in prime condition, and at a cost of only about one cent per pound, inclu freight, insurance, commission, and all the charges attending transportation.

It required a long time to create the demand which now exists in E for American cheese, and to Herkimer county, New York, belongs the cr of creating it and securing the trade. It was mainly effected by bringi high degree of skill to bear upon the manufacture generally, thus produ not only a good article, but uniformly good, or as near uniform as is pos when made in different families. Cheese had been sent abroad in small am for many years, but when once by good quality and uniformity it had sec a firm foothold, the amount exported increased with astonishing rapidity. gradual growth it had come to be nine millions of pounds in 1859; in 1860 it amounted to twenty-three millions; in 1861 to forty millions, and the demand and supply have steadily increased ever since.

That this export demand governs the price of cheese in this country is demonstrated by the fact that in June, 1862, prime cheese was bringing in Herkimer county eight cents per pound, but as soon as specie payments were suspended and gold bore a premium the price of cheese advanced with even step. When gold fell, the price of cheese receded; when it rose again, cheese advanced, and all the while just in proportion to the current rate of exchange, which proves conclusively that to cancel indebtedness, or to pay for goods purchased in England, the cheese was as good as the gold, and answered the same purpose exactly. With a market of such great capacity open to us, it seems as certain as anything in this uncertain world can be, that the manufacture of cheese will increase annually, and I see no reason why all farmers who possess really good grazing land may not share in the profits of the manufacture.

In order to make cheese a staple article of export, it is necessary to be able to manufacture an article which will suit the market to which it is sent, and also that it be of even quality so far as practicable. As this market is chiefly in England, it will be well to inquire what sort is there in greatest demand. The names of Gloucester, Leicester, Wiltshire, Dunlop, Cheshire, and many others are familiar to all, but it may be less generally known that of late years the sort known as the "Cheddar cheese" is rapidly displacing all others, being generally acknowledged superior and bearing the highest price of any made simply from whole milk. Stilton cheese sells at a higher price, but it contains cream from other milk, and its manufacture is not supposed to be especially profitable. The superiority of the Cheddar is due to the fact that a more

ıtific process is employed, and one by which not only fine quality
nıformity also is more easily attained than by any other method. The
· Cheddar" is from the village in Somersetshire, where it was first ı
mprovement has, perhaps, been more marked in this than in almost any
ction in either England or Scotland; for we find that a hundred year
: cheese of Somersetshire was inferior to that of North Wiltshire. Ed
e, esq., in his "Observations on Husbandry," says:

"Being with Stephens, about East Lydford, near Somerton, in Somersetshire, and l
iness with a great many farmers, I found by Stephens, and by the confession of
. rs, that notwithstanding their lands were much richer than those of North Wil
y could not pretend to make such good cheese as was made in North Wiltshire, an
ese of the same sort would outsell the Somersetshire by three or four shillings
rt. It was allowed, also, that the Somersetshire women could not make a cheese
llow coat like those of North Wiltshire; wherefore the Somersetshire women, to di
put saunders into their milk to give a yellow color to the coat of their cheese,
ing a yellow color also to the inside, when people put in the taster they found out t
upon discovery they made exceptions, for the inside of the North Wiltshire ch
ite; and it was confessed by all and agreed that down further westward, though th
better, the cheese was worse than in those parts of Somersetshire which I spe
y allowed, also, that at Winchester fair, if the fair was dull, the Somersetshire mer
y a day or two longer than the Wiltshire men before they could sell."

Time has changed since Mr. Lisle wrote, for we now find the Cheddar Somersetshire holding the first rank as an aristocratic cheese, although quantities of Cheshire, Dunlop, Gloucester, and others are still dispos It may perhaps be doubted by some whether there be any acknowl standard of quality by which to decide whether one cheese is better another or not. The tastes of people differ very much; one would have c w, mild, soft; another wants it old, hard, strong, or perhaps mouldy, a on; one may even prefer it made of skimmed milk and got up in true oak style. We maintain that there must be a standard, and one aside occasional prejudices; if not a standard for all persons and places, certainl for the English market taken as a whole, else how should dairymen know to aim at? How should buyers know what prices to offer or what to s How should judges at cheese shows decide where to award premiums? is the standard?

Mr. Willard, the author of several excellent papers on the subject of c , says of a Herkimer county cheese forty days old lying on the table to be boxed for market:

"It is of a rich, creamy, or golden color, with a firm, smooth, and elastic rind; it good proportions, its circumference gently swelling out, giving it an appearance of p ness and completeness; it is free from cracks, mould, or outward imperfections. Und hand it has that peculiarly firm, yet soft, velvety texture, which, to the expert, is a satisfactory evidence of its quality; it is neither hard nor too soft, but will feel n ber than elastic when pressed by the finger. This cheese, since it came from the never leaked whey; it has never huffed even during the hottest weather, and c h time, be safely sent to market. Bore it with your tryer, and you will find it m , and solid, with a mild, pleasant flavor, rich, buttery, and melting in the mo se which will sell in the market for the highest price."

Now see what our transatlantic cousins say. At the great cheese sho Cheshire, in 1858, one of the judges, Mr. Corderoy, of London, says: want cheeses rich, solid, fine-flavored, true colored, that is, of even color thr but, firm, sound, handsome, and that will go on to improve for twelve mo or longer, if required."

. Harding, of Somersetshire, says: "A good cheese is close and fir , yet mellow; in character or quality it is rich, with a tendency to the mouth; the flavor full and fine, apparently that of a hazlenut."

s, of Cheshire, says: "The characteristics of a good cheese are mellov

rich in taste and flavor, and firm and full in texture, solid, but not tough." Mr Patterson, of Edinburgh, says: "A good cheese is rich without bei with a sweet, nutty flavor, clear, equal color throughout, and of a com texture, without being waxy; firm, and yet melts easily in the mouth, no rough or ill flavor on the palate." It is plain that here is full, or al substantial agreement regarding the requisite characteristics of such ch will best suit the English market; and this market, it being rem furnishes by far the largest export demand which exists at the present time, a which may be expected to arise for many years to come.

It is not deemed out of place here to remark that quite a different articl and one which is firmer in texture and less rich in the butyraceous el demanded for exportation to warmer countries, or to endure with safety voyages during which tropical regions are traversed. This point, I will be resumed when treating of the practice of the art by different manufacture.

MILK.

Before proceeding to treat of the theory or practice of the manufacture of cheese, it will be well to devote some attention to the nature and properties of the material from which it is made.

Milk is the liquid secreted by the action of certain glands from the mammiferous animals. It is the provision of nature for the nourishment of young, and to this end it is most admirably adapted. Like all the se of the animal body, milk is a compound substance, and its composition a good deal according to the circumstances attending its secretion. On the milk of the cow contains an amount varying from three to five per cent each of the following substances: oil, (fatty matter or butter,) casein or matter, and lactose or milk sugar. It also contains a very small proj salts, and from eighty-five to ninety per cent. of water.*

To the naked eye milk appears to be an opaque, uniform, white liquid, such it is not in fact; and under a good microscope it is readily seen to be a transparent liquid, bearing myriads of minute globules diffused through it. These globules are the oil or butter, and give to the liquid its white, opaque appearance. Each of them is enclosed in a little sac or film. After continued agitation, or by the action of heat, these little sacs burst and liberate the fat,

* The proportion of the constituents in milk varies greatly. So far as we can judge, it depends in part upon peculiarities in the constitution and glandular system of the individual cow yielding it, and upon the food and general treatment bestowed.

Below are results of the analysis of various specimens, some of which were examined here, and others from reliable sources.

Parts in 100.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Water	85.20	85.26	86.55	85.62	48.20	82.9	89.9	90.6	85.86	83.6
Butter	4.90	4.36	4.05	4.68	43.30	7.2	2.4	1.8	4.42	1.8
Casein	3.62	5.69	3.45	4.03	4.12	4.7	2.9	2.9	7.08	3.4
Milk sugar	5.15	4.02	5.16	5.13	3.76	4.7	4.4	4.1	1.79	.8
Salts	1.12	.67	.79	.54	.62	.5	.7	.6	.85	.1
	100	100	100	100	100	100	100	100	100	100

Numbers 1, 2, 3, and 4 are of milk yielded by good cows, at good pasture feed in summer; the milk of four to six cows, mixed together, in each case.

Number 5 is the cream from No. 4.

Number 6 is the mixed milk of three Jersey cows.

Numbers 7 and 8 the milk of two good cows in poor and overstocked pasture.

Numbers 9 and 10 are two reported analyses of milk from distillery fed cows in New York and Brooklyn.

In the above analyses all the nitrogenous constituents are reckoned as casein.

which then readily collects in a mass, and, when duly separated from the other substances, is butter.

When milk is suffered to remain at rest the oily particles slowly separate, and being lighter than the liquid holding them they rise to the surface, and, together with a portion of the cheesy matter, form the unctuous clot or coat on the surface called cream. The fatty matter does not wholly separate, as a portion remains in suspension, and in proportion to the completeness of the separation the liquid assumes more or less of a bluish tint. Being only suspended, the separation of butter from milk is to a considerable extent a mechanical process. Casein, on the contrary, is dissolved in the water of the milk, and not merely suspended in it. Its separation is a chemical process. By what means it is thus held in solution is not known. Casein, under ordinary circumstances, is insoluble in pure water. It will dissolve in water in which a little soda is added. Freshly drawn milk sometimes contains a little free soda, and when this is the case it is slightly alkaline, and nearly all writers on the chemistry of milk teach that it is by virtue of the presence of this free alkali that the cream is held in solution. Thus Dr. Lyon Playfair, says:

"Milk contains about four and a half per cent. of casein. It is held in solution in the milk by means of an alkali. Any acid which removes this alkali converts the cream into an insoluble curd, which, when collected and dried, forms cheese. The acid formed when milk becomes sour also produces the same effect. Prepared rennet is a means of effecting this change."

Professor Johnston says:

"As it comes from the cow, milk contains a quantity of soda not combined with any acid, by which soda the curd is believed to be held in solution. As the milk becomes sour the soda combines with the lactic acid, and thus the curd becoming insoluble separates from the whey, or the milk thickens and curdles. Rennet, when added to the milk, changes the sugar into the acid of milk. The addition of rennet, therefore, is only a more rapid way of making milk sour."

Professor S. W. Johnson, of Yale College, has favored me with the following recent and minute analysis of milk by eminent chemists in Europe:

Cows' milk examined by Boelder and Struckmann.

Ingredients in 1,000 parts.	Morning's milk.	Noon milk.	Evening's milk.
Water	899.7	892.0	866.0
Total solid matters	100.3	108.0	134.0
Casein	22.4	23.6	27.2
Albumen	4.4	3.2	3.1
Butter	21.7	26.3	54.2
Milk sugar	43.0	47.2	41.9
Salts	8.3	6.9	7.8

The butter in evening's milk is here stated to be double that in morning's milk. Professor Johnson remarks that this has been corroborated by other observers in both cows' and goats' milk. I am not aware that this has proved to be the case usually in this country. My own observations have shown only a trifling difference.

Milk from cows of various breeds.

In 1,000 parts.	Swiss.	Tyrolese.	Normandy.	Brittany.	Angus.	Durham.	Holland.	Belgium.	Bohemian.
ter	851.98	817.40	871.80	837.48	803.20	845.60	839.72	857.70	841.80
al solid matters	148.02	182.60	128.20	162.52	196.80	154.40	162.28	143.20	158.20
ein	22.56	41.98	42.18	46.50	45.62	32.46	34.87	31.50	28.52
umen	3.08	7.60	5.50	7.24	7.90	11.14	7.32	9.10	10.20
ter	70.88	79.60	32.40	57.04	98.80	64.10	68.46	62.20	63.40
ar of milk	45.90	48.42	42.12	45.54	37.26	39.70	43.50	32.92	49.68
s	5.60	5.00	6.00	6.20	7.22	6.82	6.14	6.78	6.40

This theory has some plausibility, in view of the fact that when acids are added to milk in sufficient quantity the casein separates—that is, the curdles. So it does when by exposure to the air it becomes sour spontane which souring is due to the conversion of the lactose or milk sugar acid. But the above statements are believed to have been made upon cient data, and to be inconsistent with other indubitable facts. Although it true that freshly drawn milk sometimes exhibits an akaline reaction, it is e true that it is sometimes neutral, and also that it often exhibits a decidedly reaction. I have myself owned cows whose milk, when in perfect health in pasture, as soon as drawn, would distinctly redden litmus paper, and I known hundreds of others to do the same, thus showing an appreciable of free acid when quite new; nor did this milk curdle or become sensi sooner than other milk.

If we are to accept theories based upon isolated facts, we might in this as well say that cream is held in solution by free acid, as in the other by me alkali, but another view would account for its solution in a liquid perfe neutral. Again: if it were true that the casein of milk is held in solution virtue of a free alkali, it would be precipitated—that is, the milk would c just as soon as this alkali was neutralized. If this were the case, newly d milk would never present an acid reaction, for before this could be the cas milk would be changed to curd in the udder, and could not be drawn fr Experience has demonstrated that whether the casein of the milk is sepa spontaneously in connexion with the development of lactic acid from the version of milk sugar, or by the addition of other acids to the milk, as ticed in some countries, good cheese is not the result. To this end the of rennet is indispensable—an action the precise nature of which is not kno although it is probably what is called "catalytic," or an "action of presen a name given to an action which we know little about beyond the facts. the action of rennet in curdling milk is not due to the effect of acid easily demonstrated by any one who will take the trouble to test the dicated by the experiment alluded to in the next paragraph.

Rennet is an infusion of animal membrane. Various membranes of different animals will serve to curdle milk, but the stomach of the young sucking calf, cleaned and salted, dried, and kept a year or more, is preferred to all others. The infusion as usually prepared is slightly acid, but that it is not the acid in it which effects the coagulation is shown by the fact that it may be made slightly alkaline by the addition of potash or soda, and still be effective. *Milk which is slightly alkaline, I have found, may be curdled by rennet, which has purposely been rendered alkaline, and the whey produced in such case showed an alkaline reaction,* so that in cheese-making we may conclude that the coagulation is not effected by means of acid, as many have taught. Be the explanation of the action of the rennet what it may, we must, until better advised, be content to accept and act upon the facts as demonstrated by experience. The most important of these facts are, first, that rennet curdles milk irrespective of acid; and secondly, that the presence of lactic acid, from the conversion of milk sugar, facilitates coagulation.

In treating of the chemical composition of milk, casein is usually spoken of as its only nitrogenous constituent; but this is not correct, for milk contains at least one, and perhaps two or more, other nitrogenous constituents besides casein. Albumen is one. Its proportion is smaller than that of casein, being usually from one-quarter to one-half of one per cent., but its existence may be easily verified by taking a portion of whey rendered bright and clear by filtering and elevating its temperature. Before it reaches the boiling point the albumen which was dissolved in it, and which resisted the action of the rennet, is coagulated by the heat applied, and separated in a flocculent mass. Its office as a constituent of milk is not fully understood, but it probably plays an important

part. There is reason to believe that albumen passes into a state of decomposition and putridity with greater facility than casein.

The success which attends Borden's patent method of preserving milk so as to keep in any climate and for any length of time depends in no small degree upon the abstraction of the albumen contained in it as an indispensable preliminary. Aside from this, its manufacture consists in taking away the larger portion of the water of the milk by evaporation in vacuo, and by the addition of sugar. But these last would not avail for its preservation without the former.

It is also well known that the Devonshire method of making butter, which involves a heating of the milk and consequent coagulation of the albumen, results in a larger product than any other method, and it is equally well known that such butter cannot be kept for a length of time like butter made in the usual way, doubtless owing to the difficulty or impossibility of separating the coagulated albumen, which at once increases its weight and adds to its liability to become rancid. The usual occurrence of albumen in milk has been denied by some, but with what reason it is not easy to imagine. It has, so far as my knowledge extends, been found in every specimen which has been tested for it.

A late writer on milk, in the Dublin Quarterly Journal of Science, (page 338—1862,) says, "The normal constituents of milk are water, a small quantity of mineral matter, (ash,) casein, sugar, and butter. Albumen is only a constituent in the colostrum or first milkings after parturition."

It seems not improbable, to say the least, that the substance constituting the little sacs which contain the little globules of butter is a nitrogenous material different from either albumen or casein, although this is a matter of conjecture or of inference rather than of proof. If composed of either of these substances, how comes it to exist in the milk in a condition so very unlike all the rest of the same, which is in a state of solution, and not of undissolved films? And again: if these films do not consist of a substance of peculiar properties, why is it that after thumping and banging about in the churn for an hour, more or less, they *nearly all at once, and not in the order in which they are mechanically acted upon*, give up their integrity, break, and liberate the oily particles?

A good many questions might be asked regarding milk and its products which, in the existing state of knowledge, it would puzzle any one to answer, and which seem to require for their solution a more minute acquaintance with its chemical composition. For instance, we know that casein is a nitrogenous substance, and liable to putrefaction; we know that it constitutes from thirty to forty per cent. of cheese; and yet cheese is preserved from decay for months or years by an addition of three per cent. of salt. We know that pure butter or the oily portion of milk is not a nitrogenous substance, and not more liable to putridity than beef tallow; and yet carelessly worked butter, which contains, say, a tenth part as much casein as cheese, cannot be preserved from putridity by five nor ten per cent. of salt. Why is this? But as such queries do not bear directly upon the manufacture of cheese, we will proceed to notice some peculiarities which are equally obscure, and yet do have a practical bearing upon it.

Aside from the chemical composition of milk and the variations which attend it, milk possesses other properties, which seem to be due to the vital action by which it is secreted. These are variable also, and are of so subtle a character as to defy the scrutiny of ordinary chemistry. What is known as "animal heat" or "animal odor" is of this class. It is a well established fact among practical dairymen that if milk in considerable quantity be shut up closely in a vessel as soon as drawn, it will before long emit an exceedingly offensive odor, and this before anything like decomposition could ordinarily take place. The cause of this phenomenon is not certainly known. It is considered that, being a vital secretion, milk holds for awhile some remains of vitality, which gradually pass off as an imperceptible emanation when exposed

to the air, and when this wholly passes away the milk becomes an abso lifeless substance, subject to the ordinary conditions of dead matter. It i posed to be analogous to the case of the body of an animal, which, w departs, does not instantly assume the cadaveric state, but for awhile r flexible and even sensible to the stimulus of galvanism.

Some of the variations to which milk is subject are evidently the pro of nature for special purposes. The first milk or biestings, as it is so called, is very unlike that secreted at a later period, both in its chemical position and in its effects, being purgative. It is especially adapted t wants of the calf immediately after birth, and should never be withheld it. The milk secreted by cows during the season of sexual heat is quite that of other times. Persons in robust health may sometimes partak without injury, but it should never be given to infants. By a wise pro cows are not subject to this condition while suckling their offspring, and is dangerous to a calf should be cautiously withheld from a delicate infant person in feeble health. Such milk is unfit for dairy purposes as well direct use as food. Mr. Willard, in reply to an inquiry on this point, w as follows:

"The milk of cows in heat does sometimes play queer pranks with cheese. You will remember I suggested this to be the cause of the trouble in the three cheeses which we saw at Frazer's factory, made from one vat of milk which Mr. F. said could not be properly cooked. I have had it occur in my own dairy when several cows were in heat at the same time, when the weather was hot, and the animals were more than usually excited. In the worst cases I have attributed it not only to the milk of the animals in heat, but aggravated by that of those which became sympathetically excited, and exercised, and feverish in consequence of the cows which were in heat. Milk at such times is feverish and akin to a mass of putridity, and not unfrequently a fetid or very offensive odor is emitted from the whey and curd if used for cheese making. Such milk will no more produce solid curd than it would give health and nourishment to a calf when taken into its stomach. When made into cheese there is a tendency to undue fermentation and rapid decomposition, and its character is precisely similar to cheese made with putrid rennet. But such extreme cases are only occasional."

Serious trouble in cheese making has been occasionally experienced by most dairymen from the same cause.

It is well known that milk will often suddenly develop into a state of acidity during thunder-storms, but why it should thus become sour has long been shrouded in mystery. Some have confounded this with the effect of jarrings or joltings, or that produced by vibrating motion of the air, as by beating of drums. It is now well understood to be due to the presence of ozone, which is generated in the air by electrical action. Ozone is simply oxygen gas in a changed or, as it is called, allotropic condition. It possesses some very curious and wonderful properties, and among them intense oxydizing or acidifying powers. The remedy for the trouble just mentioned is to have the ventilation of the milk room so perfectly under control that the outer air at such times may be wholly excluded.

Until within a comparatively brief period the manufacture of cheese has everywhere been almost entirely an empirical process, the mere following of forms which have been handed down from past generations without an understanding of or any reference to those guiding principles which should direct the process. Science has at length stepped in, and in several particulars has rendered valuable aid.

It is a noteworthy fact that systematic attempts to improve the manufacture of cheese began to be made both in Somersetshire, England, and in Herkimer county, New York, about the same time; and also, that with no knowledge on the part of either of the progress made by the other, after lengthened experiments, both should have adopted substantially the same method; for it is a fact that the Cheddar and Herkimer methods so closely resemble each other that the only differences of any consequence are such as necessarily grow out of the difference of climate. Their process differs from most methods mainly in two

rticulars: first, in employing milk which has attained a proximate degree of dity, although never enough to be sensible to the taste, instead of such as is te new; and secondly, in the separation of the whey from the curd by is of the chemical effect of heat applied to the curd in the whey, thereby ing its contraction and precipitation, instead of depending mainly on mecnanical means. The improvements thus introduced within a comparatively cent period have resulted in several important advantages. First, a terial reduction of labor; secondly, the production of a larger amount l a better quality of cheese from a given quantity of milk; and lastly, cheese made by this method requires less time for the ripening process, and s is sooner ready for the market.

How these results have been attained, and can be made available to all, will be most fully comprehended by a statement of so much of the theory of the manufacture as has been demonstrated by experience to be correct; and next, by a relation of the details of practice. It may not be easy nor desirable to keep theory and practice wholly apart, but we will proceed to mention

THE IMPORTANT POINTS OF CHEESE MAKING.

1st. The first to be noticed is *cleanliness*, and this, it may be observed, is quite as important in the butter as in the cheese dairy.

2d. That the milk be rid of animal odor, and be in the proper state both as to temperature and proximate acidity.

3d. That the rennet be properly prepared, and a suitable quantity, and no more, be added.

4th. That the whey be completely separated from the curd.

5th. The maintenance of a suitable and even temperature in ripening.

First, cleanliness, absolute cleanliness; and by this is meant a great deal more than exemption from visible dirtiness. The inferior character of a considerable portion of the dairy products manufactured anywhere and everywhere, and especially the bad flavor which, although not perceptible when new, develops in an unmistakable manner with age in both butter and cheese, is chiefly owing to lack of proper care and cleanliness in the full sense of the latter term. To understand this better, let me say that cream or the curdy portion of milk is a nitrogenous body, and, like all nitrogenous animal substances, is inclined to run into putrefaction. This liability to putrefy is developed with greatest rapidity when under the influence of other substances in which decay has already begun. For instance, a piece of fresh meat placed in a perfectly clean vessel, and the air about it pure also, may keep good many days, some weeks perhaps; while if it be placed in one apparently clean, but which has had tainted meat in it previously, it will begin to putrefy in a short time. The exciting cause, although in this case invisible, is as really operative as a visible amount of filth would be. Its action is that of a ferment, not unlike that of yeast, a little leaven leavening the whole lump. Any decaying emanations, whether from spilled milk, or from any other source, communicates a tendency to the same decay, and, the change once begun, it is very difficult to arrest it. effects may not be apparent at once, but the leaven is working. Butter ssing the tendency may not, while fresh, offend the most delicate taste, ; it will most surely develop so as to be plainly perceptible after being kept. rments are destroyed at the heat of boiling water, 212°. Boiling water will readily cleanse vessels in which milk has been kept if they be of tin or other l. Possibly a slightly lower temperature may suffice for metallic vessels, t certainly not for wood; and it is safer in all cases not only to have the "sing," but the water "dance." Wood is porous, and absorbs more or milk, and be it ever so little which finds a lodgement in it, there is no rity against the propagation of the peculiar ferment. In a note from a l is related his experience on this point thus:

"The following fact shows not only the importance of having vessels for holding perfectly clean, but made of material easily kept so. We purchased a new wooden — unpainted inside, for a milk pail. The usual care was taken to wash, scald, and dry it t time it was used. It was found after some time that if the milk was allowed to remain — say, from a quarter to half an hour before being strained, particles of loppered m found gathered in the crease or angle formed at the junction of the bottom and s amount of scalding or scrubbing could prevent it. It became advisable to throw — and use a tin one in its place, when the trouble ceased. Was it not that particles o some time had become absorbed, and lodged so deeply in the pores of the wood as t of the reach of scalding water, (wood being a poor conductor of heat,) where it had 't and thus formed a *nidus* for loppered particles, which acted upon the new milk and it in so short a time."

The danger that the ferment may find a lodgment permanently in w vessels, together with the great amount of labor which their use involves cause their banishment from the cheese dairy in all cases where metal can be substituted with advantage. If wooden vessels must be us caution should be had not to employ any which have been recently On this point Mr. Willard remarks:

"Sometimes, when the dairyman has been using newly-painted pails and tubs, he find black specks and spots on the rinds of many of his cheeses, and should he cut th the same peculiarity is found throughout the cheese. This is *poison cheese*, more or les gerous to the consumer, and justly feared and avoided in the market; for though much — may possibly be eaten in small quantities without producing any serious effect or sick yet the chances are that some of the cheese is very poisonous. Now the dairyman is often perhaps generally, ignorant of the cause, and innocent of any intent to poison, and he with amazement that his cheese has been thrown out of market, or sent back to him, some family has been poisoned by eating it; but such is the fact, and the result ha brought about by carelessly using newly-painted utensils. The milk and whey hav tracted poison from the lead and deposited it in the cheese. The fact has been well tiated in numerous cases where the matter has been fully traced out. When utensi — be newly painted, it should be done at a time when they will not be needed for three and before being painted they should be thoroughly scrubbed with strong lye, in all the old flaky paint be removed, and a good clean surface be presented for the new

The cleanliness referred to should include not only the utensils, but e part of the premises. Milk absorbs odors of any kind with such facility much caution needs to be exercised lest it suffer injury by exposure to effluvia. Let milk be ever so rich, it may be spoiled before as well as rennet is added.

Having secured cleanliness in all the appurtenances belonging to the dairy, having before us pure milk in clean vessels, we come to the second point, to wit, that the milk be rid of animal odor, and be in the proper state both as to proximate acidity and temperature. That peculiar aura or effluvium which milk holds when freshly drawn has already been referred to, and it is only needful here to say that the milk should be freely exposed to the air until this has wholly passed off.

The proper condition of the material in regard to acidity is a point of much consequence, and is one to which hitherto but little attention has been paid by the great mass of dairymen in this country. When milk is drawn from the cow it is sometimes alkaline, sometimes neutral, and sometimes acid; oftentimes acid in summer, indeed, if my own observations afford a fair criterion. The milk of cows at pasture during the summer months in this country is usually acid, for in no instance has it been found alkaline, and very rarely neutral until very late in the autumn. It is never acid so as to taste sour, but sufficiently so to exhibit an acid reaction to a delicate test.*

As soon as exposed to the air, there commences a spontaneous conversion of the sugar (of which milk usually contains from four to five per cent.) into lactic

*Litmus paper is used for this purpose. It is colored blue by a vegetable infusion. A very slight degree of free acid in any liquid is detected by the reddening of the paper, and when thus reddened a very little alkali suffices to restore the blue.

.. The chemical composition of these two substances, as determined ysis, is the same, or very nearly the same, yet they are very different ces to our senses of sight and taste; and the difference is supposed t to the transposition of the elementary atoms of the sugar. Some have s cheese is best made from new milk. It is true that when too much cha y a hard, sour cheese can be made of it; it is also true that those che uch bear the highest reputation and command the highest prices, both in ntry and in Europe, are not made wholly from new milk, but from eve t morning's milk mixed. From all the evidence presented, no doubt ca ertained that the latter is the better practice; or, in other words, that irable that the conversion of the sugar of milk into lactic acid should l le some progress. The precise degree of acidity which is best is not ly known, nor have we at present any easy method of measuring it cision; but practically it is found in family dairies that if milk is kep lve hours at a temperature of about 65°, and the morning's milk be ded, and the whole properly warmed, the best results will follow, and nue separation of whey is more easily effected. As this point is deemed on ch practical importance, we quote from the best authorities in proof of sition here assumed.

Mr. Robert McAdam, of Gorsly Hill, a successful teacher of the Che method in various parts of England and Scotland, says:

"When acid is not present in a sufficient quantity the curd will require longer sti ng the hot whey, and too long stirring has the effect of hardening the curd and of ma cheese stiff to cut and deficient in richness. When acid is deficient the curd will ..ellent and taste sweet, but the cheese produced will be soft to the touch, have a tend to heave and bulge out in the sides, will be longer in being fit for the market, and whe will not have that close, solid, compact body, nor yet that richness of quality and swee of flavor which are so desirable. We are convinced that attention to what we have stat the first and most essential principle of cheese making, and that the difference betwee and middling quality is caused by inattention to or ignorance of these particulars. W the temperature of the cold milk is 64° or upwards no sour whey ought to be used; the ben present is a sufficient degree without it. When the temperature is 65° or upwards (peration of the process must be accelerated until the curd is taken out of the chees and cooled and salted, for when too great a quantity of acid is present it affects the cu is to render the cheese hard and give it a sour taste. On the other hand, when the tem ure of the evening's milk is 58° or under, it is beneficial to put the sour whey int cheese tub, before milking, along with the cold milk, as this allows the acid to begi change, and promote the degree of acidity necessary. In large dairies less sour wh needed, in proportion to the quantity of milk, than in smaller ones."

X. A. Willard, esq., of Little Falls, says:

"The requisite degree of acidity in milk for producing the best results in cheese manufa very imperfectly understood by most dairymen.

"Experienced cheese-makers have observed the fact that milk which has been cooled (o a low temperature and kept very sweet requires more rennet to form the curd, and ' coagulated is longer in cooking, and often will not work down firm, but will be soft ongy, forming what is termed a 'honeycomb cheese.' Many times a superabundan ..ey is retained, and cannot be pressed out. This soon becomes sour and putrid, the c does not cure evenly, but goes on depreciating in quality until it reaches a high state o composition, giving off an offensive odor, and not unfrequently requiring immediate ren from the shelves to the pigpen. When cheeses swell and puff up the whey oozes out, can a portion of the butyraceous matter changed to oil, and are saved with difficulty, and ed cannot be marketed at half the ordinary price of good cheese.

'The principal features of this character of cheese are given that it may be identified because large quantities are annually made during spring and fall, many dairymen knowing where the trouble lies, or how to obviate the difficulty.

"Now this results from manufacturing from milk that is *too sweet*, and which should been treated with sour whey. The use of sour whey in cheese making, when the temper of the evening's milk has been kept low, we deem of imperative necessity, if uniform, cheese of fine quality be desired. It may be observed that milk should never have acq sensible acidity before setting with rennet, but should nevertheless be well on its way tov that point. By sensible acidity we mean acidity that can be detected by the taste or s Some milk is more acid than other soon after being drawn from the cow, and often,

freshly drawn, will redden litmus paper, yet to the taste is perfectly sweet. The m cows at pasture and fed with whey or slops is more acid than that from those w nothing but grass on sweet upland pastures. But if by chance or accident the milk is so changed when about to be made into cheese, it should be set at a low temperature, a the subsequent operations hastened as far as practicable. Could there be some simple i ment devised for determining the acidity of milk, it might be used with much advant cheese making. The most practicable method, and one which we now employ, is by t the evening's milk in the morning by the thermometer. This, with experience and observation, will serve as a guide for conducting operations.

"Our remarks on the use of sour whey, it may be observed, are more applicable t cheese making than to factory manufacture, since there are various causes to hasten in factory milk, and it is impossible to watch the milk as thoroughly as where it is immediate eye of the manufacturer from the moment it is drawn from the cow until i into cheese.

"When the evening's milk stands in the morning at or below 62° the morning's m be added to it, and at the time of putting in the rennet a quantity of sour whey added and stirred into the mass in proportion of two quarts of whey for every sixty gallons of milk. If the night's milk stands below 60°, a larger quantity of whey may b used, and the quantity of whey always graduated according to the degree of sweetness of the milk. If the evening's milk stands at or above 65° in the morning no sour whey need used, as the milk is on its way towards a change, or has acquired sufficient acidity to m the use of the whey not only unnecessary, but a damage from an excess of acid.

"When milk has not been treated with sour whey at the time of adding the rennet there is difficulty in cooking the curd, it will be better to add to the mass, while cooki sufficient quantity of sour whey to harden up the curd; but it is always better, when cable, to use the whey at the time of setting the cheese, as by that means the coagula rendered more perfect, while more of the butyraceous matter is retained, and the chees sequently richer and of finer texture and flavor.

"When acid is used in this way to assist the rennet in its work of coagulation, it n off in whey and in pressing and in the cheese-room, leaving the cheese sweet, mild, fi and of finest texture. It has none of the characteristics of cheese made from milk sour, as in that case it will be hard, and retain an acid taste.

"In hot weather there will be no occasion to use the whey, unless the milk is cooled down with running water and ice at a low temperature, and so held through the night. We may remark here that it is presumed the milk-room, dairy utensils, &c., are to be kept sweet and clean, for if otherwise it will be useless to attempt to have uniformity of manufacture, for no degree of skill in manufacture will be able to counteract all the damage done when the milk is constantly absorbing sour or putrid emanations, or when taints are received from unclean dairy utensils.

"The whey should be distinctly acid, about like that coming from a sweet curd in summer weather, and standing twenty-four hours. If the weather be cool, the whey must be kept in a warm temperature, in order to acquire the requisite acidity.

"Milk treated as above with sour whey will produce curd that will be all that can be desired, which will work down evenly and without trouble, the cheese coming with a firm, compact texture, retaining more of the butyraceous matter, and having that mild, rich, pleasant flavor peculiar to first-class cheese, while at the same time it will add in quantity, and save that which would otherwise go off in the whey and be lost."

The temperature of the milk when the rennet is added is next to be attended to, and is a point of much importance. It has been found by experiment that milk coagulates soonest when at a temperature of about 115°. I detect but little difference in the time from 110° to 120°, but above or below this point the time required was longer, and a degree of heat equal to 160° or upwards seemed entirely to destroy the coagulating power of the rennet. When curdled at so high a temperature as 115° the product is much injured. The proper temperature, as determined by experience, is usually from 85° to 88°, and the whole range admissible, under the varying conditions which sometimes occur, is not more than 10°—namely, from 80° to 90°. If set below 80° the curd is long in coming, (unless an excess of rennet is added, which is highly objectionable,) is too tender, and the separation of the whey is attended with great labor, and unless extreme care is used, with loss also. If it be set at a temperature above 90° the curd assumes a toughness which is objectionable, and the cheese made from it is hard and of inferior quality.

How shall the proper temperature be determined? Our reply is, by the use of the thermometer, and in no other way. The answer given by the practice of a majority of dairywomen is, by the feeling, by judgment, by the verdict of

practical hand; and doubtless they honestly believe these to be sufficient, l may ridicule the use of scientific instruments to determine so simple a ter. But the truth is, that feelings, though very useful in their place, are t to be depended on to determine temperature. Our bodies are constantly ted by too many disturbing causes to afford a reliable index to slight dif- nces. Tell a man when suffering from fever and ague that he is no warmer w, when seeming to be on fire, than he was a little while ago when shivering der a heap of blankets, and, unless he is assured of the fact by other evidences man his own sensations, he will believe you to be laboring under an egregious take. He may very likely take you for a fool, and perhaps exclaim, "Don't know when I am burning and when I am freezing?" and yet the fact is as you stated to him, and easily demonstrable by the introduction of the bulb of a rmometer beneath the tongue or under the armpit. A very simple experi- nt will satisfy any one that the sensation of cold or heat is not always, even en in perfect health, in consonance with the fact. Take two basins partly ed with water, one as hot as you can comfortably bear, and the other as cold. unge a hand in each, and after a little while pour one into the other, and put h hands in it; one hand says the mixture is cold, and the other says it is warm. No; if you desire a good product uniformly, and not merely occasion- y, there is no other way but to use the proper means, to wit, the employment an instrument acting by expansion and contraction in accordance with a fixed r, undisturbed by any of the many causes which affect living bodies.

How shall the desired temperature be attained? By heating, of course. But the way of doing this may affect the product. Milk should not be heated by the direct action of fire upon the vessel containing it. If a tub is used, the common method has been by warming the milk in a tin pail or other vessel set into a larger one of water to which heat has been applied. If this method is opted the whole milk should be warmed, as if only a portion is heated, and nat sufficiently to warm the rest to a proper degree, there is some danger that some of the buttery portion will rise as oil and escape with the whey. If a tub must be used, the better way is to introduce a tin pail of hot water into the milk in the tub and gently move it about. By a similar method, namely, by using a pail of ice-water, the evening's milk may be cooled when to be kept over night in a wooden cheese tub in warm weather. In this way a proper temperature may be attained, and none of the milk heated too much. But the best way by far is to use the improved apparatus consisting of a double vat, the inner one of tin containing the milk and the outer one water, which is warmed by a fire of a few chips in the heater below. There are quite a number of these, differing somewhat in construction, several of them being well adapted the purpose for which they are designed.

Third. We come now to the means of effecting coagulation, or the precipita- tion of the curd; and our first point is, *that the rennet be properly prepared, sweet and good, and that a sufficient quantity, and no more, be added to the milk.* This point is of such practical moment that it is not extravagant to say that scarcely one dairyman in a hundred, even in old dairying districts, realizes to the full its importance. Milk can be curdled in various ways, but to make good cheese rennet is indispensable. This is a preparation made of the stomach a sucking calf. It is better that the calf should be not less than four nor re than ten days old. A healthy stomach when taken from the calf has a r, clean, whitish appearance; if discolored, or marked with dark spots, or a reddish cast, showing inflammation, it ought not to be used. The stomach to be emptied of its contents and cleaned without washing or scraping; lly salted and stretched on a stick in the form of a bow. When it is ; up to dry it is well to put in a little salt, but not to fill it; and care should n not to hang it in too warm a situation. In some instances the entire ck of rennets of a dairy have been rendered worthless by being dried too

near the stove-pipe. They should be hung in a dry atmosphere in a moderately warm. It is a curious and unexplained fact that free thawing when the skins are green, in the spring, increases their efficacy. are stronger, also, at a year old than when new, and the dairyman will d to keep a good stock on hand. It is important that just enough, and be added to the milk to effect coagulation in about fifty minutes.

To accomplish this the liquid rennet must be prepared with care, an strength ascertained by previous trials. The practice of the best che is to take four or six skins and soak them in milk-warm water—a quart to each skin—with occasional rubbing during two or three hours, a salt enough *fully to saturate* the liquor. Repeat this process three that there shall be altogether half a gallon or a gallon of liquid to e mix these infusions and strain through several thicknesses of flannel, salt, and, if you please, a few lemons sliced, or a little spice, *and kee glass demijohn or stone jar.* Do not fail to have an excess of salt, so some will remain undissolved, and keep the vessel containing it in a cool If a smaller quantity be wanted, take a half or a fourth of several sk prepare in the same way, as by this method subsequent parcels can be of nearly or exactly the same strength, while if a whole one be used time and another the next, the strength of the liquid may be very une good skins are used, and a gallon of liquid be made from each, the pro is that a pint of it will suffice to curdle fifty or sixty gallons of milk in or fifty minutes, which is the proper time to be occupied in the co After a few trials the amount necessary can be determined very a Too much caution cannot be exercised to have the rennet pure, clean, and Properly prepared, the liquid is bright, clear, and effective; perfectly fre any disagreeable smell or taste, and, with suitable care, may be ke weeks in good order. I have known it sometimes safely kept thro entire season. But if rennet is faulty in any respect, the cheese wil accordingly.

Mr. Willard very justly remarks:

"Tainted rennet is the source of infinite mischief to the dairy, even when the taint is so slight as to be unsuspected. It produces ills well known to the dairyman as huffing, r decomposition, nauseous stenches, the breeding of mites, and often the entire loss o cheese."

An instance in illustration of Mr. Willard's remark may here be cited. An old dairyman, in Herkimer county, a few years ago, lost a large quantity of cheese, and neither he nor his neighbors for a long time suspected the cause of the trouble. The cheese seemed perfect when made, but the fermentation soon became violent, and the cheese would turn itself completely out of the bandage. One after another they were thrown to the hogs. He changed his rennet, buying new skins of his neighbors, but the liquid was put in the same wooden tub formerly used, and which, without his being aware of the fact, had become tainted. At length, on the suggestion of a critical friend, who examined the dairy, he threw the tub away, with its contents, substituted a stone jar, procured good skins, and the trouble was at an end.

Be the rennet ever so faultless, it is well to add no more than just enough to accomplish the desired end. It is often supposed that if more be added the only effect is to hasten the curdling, and that the excess passes off in the whey; but there is a liability incurred of a disagreeable "rennety" flavor, and of disturbed and irregular ripening. Besides this, when too much rennet is used, the curd forms too rapidly, and the cheese in this case is too hard, and often rather sour also. On the other hand, if the milk be not coagulated within an hour, the curd will be too tender, and cannot be easily separated from the whey without loss of butter and consequent deterioration of quality to the cheese. No better rule can be given than to add rennet enough to bring the curd of a firm-

) cut in from forty-five to fifty minutes. To judge when this is obtained, ɜ the finger, and if the curd breaks with a clean fracture as it is lifted, ıswer. If it has a pasty appearance, let it stand a while longer.

SEPARATION OF THE WHEY FROM THE CURD.

ı. It is well understood by all cheese makers that unless the whey be separated from the curd the product will be imperfect. If much whey within it is liable to leak, and the lactose or milk sugar being converted c acid, a sour taste is early induced. It is liable also to undue fermen- pecially in warm weather, during which fermentation gases are engen- ndering the cheese porous. If in a warm place it swells, and when the pes it emits an offensive smell. As the fermentation subsides, the ɜ liable to careen and become unshapely. The flavor is injured; a ıngent, ammoniacal taste being acquired, and the putrefactive decom- thus having begun, the cheese ere long spoils and becomes utterly s.

rous methods have been employed to effect a due separation of the ost of which depend for their efficacy upon mechanical manipulation, lve considerable and protracted labor. It is in this part of the manu- hat the greatest improvements of modern times have been made. It found that heat, gently and properly applied, has the effect to contract and expel the whey. In its proper application lies much of the art of ture, for it is as capable of producing injury as good. What is tech- alled "scalding the curd" is common to several methods, but what is ler this name differs very much. In some the curd, when solid enough, or cut up in a curd mill, and warm water or whey is poured over it to ı short time. This is doubtless beneficial so far as it goes, but it is al to accomplish the ends which may be secured by a proper cooking ard in the whey, an attempt to describe which will be made when we speak of practice. For the present our statement is simply this: that table application of heat to the curd while yet in the whey, the latter ɔo thoroughly separated from the former that it will nearly all drain off, ɾ that scarcely anything remains for the press to accomplish except to e whey which remains upon the surface of the particles of curd to cause adhere to each other in a solid mass, and to shape the mass into the orm.

The last point of importance in the manufacture of cheese is the main- of a suitable and even temperature in ripening.

ump of curd as it comes from the press is not yet a cheese. It is fit or the table nor for market until it has undergone the process of curing ing, a more important item in the manufacture of cheese than many it to be. The chief feature of this ripening process is a sort of fermen- ɔmewhat analogous to what takes place in the ripening of a pear after ked from the tree, by means of which are developed the good or bad , particularly flavor and odor, which the materials and the process em- are calculated to produce. What the precise nature of the changes ke place during this fermentation may be is but imperfectly understood est chemists. There seems reason, however, to believe that the fatty ı react upon the moist casein, which reaction causes a change from its *curdy* state to a different one which may distinctively be called *cheesy*. ɔ believed that while this change is going on certain flavoring principles rated from the glycerine which is present in the buttery portion, and m] t, accordingly as the process is skilfully or badly managed, an ɔr (reeable taste, and the characteristic odor of cheese.

we do know beyond a peradventure is, that for the production of a le a moderately warm and even temperature is desirable, nay, is in-

genuity has not been idle in this department, but has devised im-
ıch superior to the old cheese-tub formerly used, or even to those
the best European dairies, as the best American plough of to-day
he clumsy wooden one of a century ago; or, for our use at least,
ieavy, costly English or Scotch ploughs now highly esteemed

ortance is the cheese vat, in which all the operations may be per-
he time when the curd is ready to go to press. Patent cheese
s forms and degrees of merit have more or less extensively been
) different sections. Of those now manufactured and sold, I ob-
Western Reserve Vat" in frequent use in northeastern Ohio, and
where. In New York the more popular ones are the "Empire
O'Neil, and the "Oneida Vat" of William Ralph & Co., Utica,
Both are used to considerable extent, are ingeniously devised, con-
ninently labor-saving. If called upon to express an opinion of
nerits, or a preference for one over the other, I would remark that
l an examination as I could bestow, and from diligent inquiry and
their practical working and results, the preference would be given
eida Vat, as most perfectly combining strength and durability of
nd simplicity of arrangement, with evenness of heating, perfect
perature, and economy of fuel. This vat was commended in high
hom I consulted who had used it, or had known of its being used.
st premium at the New York State exhibition, and at others also.
r length of this paper is our excuse for omitting illustrations and
led description of this vat. Any one, however, desirous to learn
. procure a descriptive circular by addressing William Ralph &
ew York.
vat was formerly used chiefly in private dairies, but latterly it
duced into factories in place of double vats of somewhat similar
)ut heated by steam, which was supposed to be a cheaper method.
er of both choice butter and cheese for the southern market from
, and which will be treated of further on, says in a note recently

ised steam to heat the milk, but gave that up and adopted Ralph's vats,
ir superior to steam in safety, economy, and uniformity of the heat, and they
general use in this region. I have already received and forwarded orders to
ats for six or seven new factories which have sprung up on our success."

ises are almost numberless, and greatly varied in construction.
here some one is in constant attendance the common screw is
ut in private dairies it is needful to have a press which will follow
without such attention. The best which has fallen under my
Oyston's "Herkimer county cheese-press," invented and sold
yston, of Little Falls, New York, embracing the application of the
lever. In no other I have seen is the power so easily increased
is most needed. As the resistance to compression rapidly in-
he reduction in the size of the object pressed, it is important that
ion of the power should increase in about the same proportion,
mirably effected by the toggle joint.

PRACTICAL OPERATIONS.

ow attempt to describe the method of manufacturing, in private
milk into cheese, after the Cheddar, or, which is substantially
rkimer county method, in the way which will produce an article
ighest price in the London market.
ig milk, drawn about 5 o'clock p. m., is turned into the vat and
ts temperature is reduced to 65° Fahrenheit. Cooling is effected

by the introduction of cold water into the outer vat, or by pl in i
coolers filled with ice and water. The temperature should not be m
go much below 60°, as the product would be diminished by too g
Stirring the milk during the cooling process serves to prevent
cream to the surface during the night. If kept at this temperature,
it will be in the best condition for use the next morning without the
of sour whey. About twelve hours later the morning's milk is added.
cream has risen, it is carefully incorporated with the mass of milk. If
has been kept below 62° during the night, sour whey of the day
added in the proportion of three to six quarts to the hundred gallons, ac
ing to the sweetness of the milk. If kept at 64° or above, no
and its addition would do harm rather than good. A fire is t
heater by means of a few chips. With a well-constructed ap
Oneida vat but little fuel is required, and the whole mass of milk is
formly elevated in temperature until it reaches 88°. Rennet is then
thoroughly mixed in. The vat being graduated on the inner side, the
of gallons is readily observed. The strength of the rennet having b
tained by previous trials, just enough is incorporated into the milk to
in forty to fifty minutes. Herkimer county dairymen prefer to have the
properly formed in forty to forty-five minutes. Somersetshire dairy
England, prefer to have a whole hour occupied in the coagulation.

If set at too low a temperature, the flavor of the product is in
affected, the process of coagulation is slower, the curd is too soft, and
is separated with more difficulty, and apt to be turbid, involving a loss
butter and casein, and reducing the product in both quantity and quality.
the milk be too warm, coagulation is too rapid and adhesive, and the
rendered tough and hard. With the rennet is also added a very smal
tity of a preparation of annatto, made by dissolving the best quality wh
be obtained in a weak solution of potash. The English liquid annatto,
is prepared by Nichols, and also by Clements, and sold in large cities, is
preferable to the crude article usually sold in shops, but is more e
retail price being five shillings sterling per quart bottle. The expense
great, however, as four or five cents' worth is sufficient for a hundred p
of cheese. Enough only should be added to produce a light straw or
color. The rennet and coloring having been well incorporated, the
covered with a cloth, and left undisturbed until the curd is fo
the process be properly conducted, therefore, the curd will be
about three-quarters of an hour to be sufficiently firm to cut, not
but splitting apart readily when a portion is lifted on the finger.
now to be cut, in order to allow the whey to subside and collect by itself
and free from the butter and curd. The coagulum, when first formed,
exceedingly tender and delicate substance, and the butter is held with the
by a very frail tenure. It is the casein alone which is affected by the
of the rennet, the latter having no effect on the oily globules which are
stage merely imbedded mechanically in the curd. If it be roughly or care
crushed, there is sure to be a loss of more or less of the oily or buttery
tion, and of the curd also, escaping as "white whey." Many contriv
cutting have been employed, among which are wooden knives; wire
with coarse meshes; cutters made of thin strips of metal crossing each o
right angles, to be thrust downwards; shovel breakers; revolving breakers,
The best instrument I have seen is known as "Young's dairy knife,"
ing of a gang of four or more very thin, smooth, two-edged steel blad
fifteen inches long, thus having ten or fifteen feet of cutting edge to
By passing this knife through the curd, first lengthwise and then
the vat, it is very smoothly cut into perpendicular columns,
ing, crushing, or squeezing, and the whey escapes clearer and

l or oil than by any other mode. Some dairymen are confident that a
or two or three pounds in the hundred are effected by its use over any
de, and the saving being chiefly of butter, the richness of the product
espondingly increased. In Herkimer county it has nearly displaced all
contrivances. One with four blades only is commonly used in private

standing for ten or fifteen minutes, the curd is to be again cut still
, both to facilitate the escape of the whey, and in order that the cooking
w commence may be uniform. As soon as the whey forms rapidly and
c sinks, a gentle heat is to be applied, and the whole mass slowly
a. If the vat is inconveniently full, a portion of the whey may be first
out. The thermometer must be frequently used to determine the tem-
sure, which must not exceed 100° Fahrenheit in any case. A heat of 98°
y sufficient, and better than a higher degree. While the mass of milk
g slowly elevated to this point, it is gently worked with the cutting
both to secure even cooking, and to cut the curd into fine particles.
hese are of the size of wheat kernels, or of wheat and peas mixed, they
to steep in the whey; a cloth is laid over the vat, and the hand or a
occasionally introduced to stir it enough to secure uniform cooking.
believed that one effect of this protracted steeping in the warm whey is
t the sweet, nutty flavor so highly prized in the Cheddar cheese.
time required for cooking the curd varies considerably by reason of
endant circumstances, such as the degree of acidity of the milk, the
re of the atmosphere, the quickness with which the curd came, &c.
curd come quick, it will cook quick; if the degree of acidity be con-
le, it will cook quicker than if neutral or alkaline. Something also
o depend upon unobserved peculiarities of the soil of the district, or of
from which the milk is produced. The time required is rarely
nan an hour; it is not often beyond two hours, although occasionally pro-
l to three, or even four hours. Under ordinary circumstances, with a
erature not exceeding 98°, an hour and a half or two hours may be con-
ed an average of what is necessary.

o determine when the cooking process has been carried to exactly the
t point requires practical skill, which cannot be obtained from any mere
ons. The instructions of a competent teacher and careful observation
rt of the learner are needful. Close attention and experience are also
ed; for the precise degree which is best on one farm or in one locality
een sometimes found too much upon another and too little upon a third.
ne case the product may be too soft and wheyey, and in another hard and
lone, with precisely the same treatment which in a third case is attended
most perfect results. This arises doubtless from variations in the
employed, and variations they are which are not cognizable upon in-
or even careful examination. Were milk always the same in all its
s and properties, cheese making might be conducted with mathe-
ness; but such is not the case, and with all the aids of science
will always be ample room for the exercise of judgment and practical

the cooking progresses the curd becomes firmer in texture; it loses its
; it holds the buttery portion in closer combination with itself, so
usage will disengage less of it than before; and its color deepens
; the milky look it had is changed to a creamy one. To determine
ooked sufficiently, some take out one of the larger particles of
pen, and note if the change of color extends through it, or if the
a milky look; some put a bit between the teeth to see if it will
In Herkimer the dairy maid usually judges by a certain grain

feel, and by the general appearance and elasticity of the curd wl
is taken and squeezed. If the particles fall apart readily when t
it is considered done; if they adhere together, the heat is contin
some other sections to continue the heat until the particles th
apart would be to overcook the curd and get too hard a c
curd has very nearly reached the desired condition, the strainer is
the corner of the vat, the cork withdrawn, and the whey rapidly ru
may be conducted by a pipe beneath the floor to the whey tub in
building. The vat is then tipped up a little, the curd drawn to the hi
and when sufficiently drained the salt is added and evenly worked
the whole mass. The proportion of salt used varies somewhat. In
Cheddar cheese in England it is usually one pound to fifty-six of curd.
Herkimer county it is usually from two and a half to two and three-
to every hundred pounds of curd. The more salt is used the slower
the ripening, and the longer the cheese will keep. Care should be gi
use only the purest and best salt to be obtained.

Another method of salting, introduced by Mr. De Angelis, of Ho
Patent, New York, deserves mention. It is by dissolving the salt in the
before being drawn off, or rather when only partially drawn off, so
salt may penetrate the particles of curd without friction. This tends to
a more even distribution of the salt, and also a richer product, by saving
or less butter and curd, which, being crushed and liberated by cont
the sharp-edged particles of salt in the ordinary method of mixing, es
the latter portion of the whey as it passes off. It has the disadvantage o
quiring more salt than is taken up by the curd, a considerable portion
left in the whey, and also of uncertainty in the amount taken up by
If the latter objection can be successfully obviated in practice, its adv
would probably more than compensate for the additional salt required.
curd, when salted, is to be dipped into the hoop, in which a cloth is first
and put to press. Its temperature when it goes into the hoop may be
60° to 65°. An error of some dairymen is to cool the curd by means of cold
water or whey, which impoverishes the cheese by washing out s of its
richness. A far better method is by stirring and exposure to the air,
while it cools, imparts a fine color also. It is not as well known as it sh
be, that exposure to the air heightens the color of cooked curd, and by
tinued exposure before, during, and after salting, before putting to pr
light golden or rich cream color, which is really the most desirable shade,
be obtained without the addition of any foreign substance. When
press it is well that the pressure be gentle at first, but in a few minutes it
be very considerably increased—say to half a ton or more if it be a
cheese; for curd properly cooked is not only already rid of much of the
which by other methods of manufacture must be worked out, pressed
dried out, but the curd and butter are so thoroughly combined and com
together that comparatively little danger exists of loss by reason of the
of either with the whey. The separation of the whey in well-cooked
so complete that little remains for the press to accomplish beyond the r
of the moisture which adheres to the outside of the particles, and to
them together into the form desired for the cheese. So complete is the
ration that frequently not more than two quarts of whey can be ob
the press from a cheese of a hundred and twenty pounds.

Thus treated, the curd retains all its natural richness, and the ch
sweet, nutty, new-milk flavor peculiar to this process. The cool
also to be equivalent to a portion of the curing process needful w
other methods; for we find, when made from curd properly c
will ripen with greater facility than by the modes formerly in
maining in press two or three hours the cheese may be rem

rd smoothly, and a bandage of the proper length and width, first sewed ether at the ends, applied. The top and bottom of the bandage are most ly drawn together, and kept in place by a string run in the edges which an inch or two over the sides. The cheese is then to be returned to the ss, where it remains under heavy pressure until the curd of the next day is ly to take its place in the cheese hoop. It is then taken out and removed the curing-room, where it is rubbed over with hot whey butter, usually red with annatto, its weight and date marked on it, and for thirty days or re turned and rubbed daily, and oiled as often as necessary. The rubbing ld be carefully and thoroughly done, so as to brush off and destroy any that may have been deposited by the cheese fly; for if neglected, especi- ly in warm weather, skippers will work their way into the cheese and under bandage and cause serious trouble.

If it be desired to practice this mode of separating the whey by cooking the d without the use of a vat, it can be done after a fashion in the ordinary ese tub, but involves greater labor and less certainty of a thoroughly well- le product. In such case, as the whey subsides, dip out a portion of it into un vessel to be set in another of hot water, and when warmed—say to be- en 130° and 140°—let one pour it slowly into the tub containing the rest the whey and curd, while another stirs it briskly but gently, so that no part ts overheated; the effect of which is to separate some of the butter which escapes, and to overcook the outside of the particles of curd. Too much will cause curd to run in the whey like toasted cheese, and a coating of tough substance acts like a water-proof wrapper, and effectually shuts up ever whey remains outside the particles. This would result in an im- ct product, of course, liable to leak and puff, and to be porous and rank ored. In using a tub it is necessary to heat successive portions of whey, u of which must be added with the same caution. Except for the differences ecessitated by the employment of inconvenient vessels, the process is to be same as when a properly constructed vat is used.

MANUFACTURE OF CHEESE BY ASSOCIATED DAIRIES.

Reduction of labor and increase of product have been greatly assisted by he introduction into families of improved apparatus in place of the old-fash- ned cheese tub and other utensils. But the great and radical change which as still more recently passed upon cheese manufacture has been by the adop- n of the principles of association. The advantages of association in the con- t of various branches of art and manufactures are well understood and reciated; but the farmer has hitherto considered himself excluded from icipation in them by reason of his occupation. To a considerable extent undoubtedly excluded; but his case admits of some exceptions, and here notable one, not only in theory, but abundantly proved so by facts. In manufacture of cheese a considerable time must necessarily elapse after rennet is added before the curd goes to press. One of the most prolific urces of inferiority when made in families is the temptation or supposed c y to hurry the process. This may require only three or four hours, perhaps it may need seven or eight. Whatever the length of time re- ed, the process cannot be hastened without serious injury. During this there is little or nothing to do but to note the progress which is making; th proper facilities it is scarcely more work to make up the milk of fifty than the milk of five or ten, and so it is comparatively little more to make t of five hundred than fifty.

ut ten years ago Mr. Jesse Williams, living near Rome, Oneida county, ork, conceived the idea of turning the above fact to practical advantage ing up the milk of his neighbors into cheese, together with his own. this idea of associated action was doubtless original with Mr. Willia

it had been previously adopted to a considerable extent in Switzerl
cially in those cantons where the famous Gruyere cheese is made. M
son, in her work on "The Cottages of the Alps," tells us that in 1
were several hundred cheese societies in the canton of Vaud alone.

With Mr. Williams the plan worked well, and before long he incr
facilities so as to make up the milk of four hundred cows or more.
are usually cautious, and slow in changing long-established customs
tices; but the advantages of this new notion were so evident and ind
that gradually similar establishments were set up, and when I was there a
ago it was said there were over ten of these cheese factories within a
about ten miles. During a visit the present year (1863) the number
to be largely increased, and so recently had many of them been establ
it was not easy to ascertain with certainty how many were in actual o
From various sources, however, a list was obtained of more than thirty o
cheese factories in Oneida county alone, besides five in the adjoining
Herkimer, and of several in other sections; and they would average n
hundred cows to each.

Some twelve or fifteen years ago the experiment was tried on the
Reserve, Ohio, of buying up curds made in family dairies, to be scalded,
pressed, and cured at several establishments started for that purpose, bu
some years of trial they all failed.

The advantages which it is generally conceded attach to the mode of
tion now in successful operation, over that by private families, are
quality and uniformity of product, by reason of which a higher price
manded; also a saving by buying at wholesale such materials as
boxes, annatto, &c.; and more than all, in relieving the farmer and
the labor and care of manufacture and of ripening. The higher price
has in all cases been found, so far as my own observation extends, to be
to the cost of manufacture, and in not a few instances has resulted in a
gain of as much more. This is no more than should reasonably be ex
When a high degree of skill and undivided attention are bestowed on any
of industry, we look with confidence for beneficial results, and the prosp
in no way damaged if ways and means are found whereby five are enal
accomplish as much as thirty or fifty used to do by former methods.

These establishments, in all cases where I have known them, partake to a
greater or less degree of a mutual character. Sometimes they are erec
owned by an association of a dozen or more, who intend to bring their
it to be manufactured, and who appoint a superintendent and an executive
mittee to have charge of its entire management. In such cases it is
to deduct from the proceeds the salary of the superintendent, wages of
tors, and all other expenses, together with a certain per-centage, usually
or twenty, supposed to be sufficient to compensate for interest on cap
ployed, and for depreciation of buildings and machinery, and then to
the remainder in proportion to the amount of milk contributed by each.

The buildings are erected and the apparatus furnished by one or two,
first make an agreement with the neighboring farmers to supply the milk
certain number of cows for a certain number of years, and in return receive
their proportionate amount of the proceeds of the sale of the cheese,
ducting a fixed sum, usually one cent per pound, for manufacturing,
their proportionate share of the cost of salt, bandages, boxes, and
items of incidental expense. When operated in this method, it is suppos
the milk of not less than four to five hundred cows is needful to m
ing business on the usual terms, and that profit rapidly increases
as the number of cows is greater.

In selecting a location for a cheese factory two requisites
that it be central and easy of access; and next, that it be

ıfailing supply of pure cold spring water. It should be abundant, also, and temperature should not be above 50° Fahrenheit, unless the supply is ıry plentiful, in which case a temperature a trifle warmer may serve a tolerable ıse. At one factory which I visited on the Western Reserve, in Ohio, the ıng had failed; consequently, not having cold water to reduce the tempera-ıe of the evening's milk, it was made up both night and morning, thus in-ılving night work, double labor, and even more, for it required longer cooking; not being acquainted with the use of sour whey in milk too sweet, the result ıs an inferior product.

T ı necessary buildings comprise a room for manufacturing, containing the sink, and a press-room adjoining, and a curing-house which is at a short ance from the others, both to be safer from fire and to avoid dampness. The ıions, where the milk of six hundred cows is used, are usually about twenty-ı reet square for the manufacturing-room, and a story and a half high; press-room irteen by forty feet, and the curing-house twenty-six by one hundred feet, and ro stories high; all this cheaply built. The cost, with apparatus and fixtures, usually about $2,500 or $3,000. The milk is brought to the factories by the ntributors in tin cans of circular form holding from thirty to eighty gallons; ıe covers have a rim or flange six or seven inches wide, closely fitting the inside the can, with an aperture in the top to allow the escape of air as the cover is d down to near the surface of the milk, when it is closed with a cork. This ctually confines the milk, and prevents agitation and splashing in the carrying. ı cans have a faucet at the bottom, through which, when arrived at the fac-ıry, the milk passes into the weighing can set upon a platform balance, from ch, when weighed and credited to the producer, it runs through a tube into the below.

ın most cheese factories steam is used for warming the milk and cooking the rd. In some there is merely a steam boiler set in brick work and provided th pipes, while in others there is an engine also, usually from four to eight ıorse power. The milk as received is conducted into vats of from four hun-ed to six hundred gallons capacity each. These vats are made double, and ually of cheaper construction in proportion to their size than those used in ırivate dairies. The inner one is of tin, and the outer one of wood, with a space etween of about two inches. This space is for the reception of water, and is ırovided with pipes conducting from the boiler, and so arranged that when steam s let on it may be distributed through the water as evenly as possible.

It is generally supposed to be cheaper thus to use steam than to employ ıuch an apparatus as is most suitable for family use, and very possibly it may ɔe cheaper at the outset, but if Ralph's Oneida vat and heater are employed, daily expense of fuel would be much less, all risk of explosions or other cidents from steam wholly avoided, as well as the loud and very disagree-ıle noise caused by the steam as it is driven into the water of the outer vats.

The factory of Mr. Allen, near Rome, New York, is supplied with Ralph's s. There were three of them which I saw in operation when there the past ımer. Their capacities were severally six hundred gallons, five hundred forty gallons, and four hundred gallons, which served to make up the of four hundred and ninety-six cows. Only one of these vats had the hot-ter tank attachment, which was found to suffice for all three. My obser-n of the working of these vats led me to coincide with the opinion ex-d by Mr. Allen of their superiority over the vats heated by steam.

ıne presses commonly in use are of the simplest character, being merely iron screws with the necessary wood work. These are found to answer a purpose here, some one being always at hand to attend to them, families, where a press is wanted which will follow up the work with-close attention. The sink where the curd is drained and settled is placed t to the vats, and is movable, being on rollers and placed on a track

leading to the press-room. Tables and racks of convenient height ling the cheese are arranged in the curing-house. On these the placed as it comes from the press, and here it remains during the p curing. Each cheese, when placed on the table, receives a record of its and date neatly marked on its bandage. The wood best adapted for is hemlock. It should be well seasoned and made smooth and level. sometimes used, but being more or less resinous is liable to impart a flavor to the cheese; the cheese also adheres to it more closely than u lock. Wood like basswood is objectionable and should not be used. cheese adheres to it so closely as not to be readily loosened, marring tu and often taking out considerable portions of the cheese itself.

The cheese-rack is a recent invention and a great improvement table. It consists of four by five inch scantling with the corners be cut so as to be five-sided. These are framed the proper distance ap ends and set on legs of the desired height, forming a skeleton table. covers of inch hemlock or pine, bound with stout elm rims three or wide, set upon the racks and hold the cheese. When a cheese is to be a spare cover is placed on top and the cheese and cover turned over. cover now on top is removed, rubbed with a cloth, and is ready to the next cheese. The rims of the covers protect the edges of t the process of turning, and a part of the cheese swinging down in space between the timbers, and the rims resting on the bevelled edges or renders the operation easy and insures safety to the cheese. A large can be turned with as much ease on a properly constructed rack as the ing of a smaller one on a table preparatory to its being turned. Large c are difficult to handle on a table, and are liable to have their edges bu otherwise marred in turning.

The windows of the curing-house are provided with curtains or sha prevent too much heat and the direct shining in of the sun. Sufficient tion is also provided for. In all the establishments recently erected th labor-saving arrangements too numerous to be here mentioned in detail, add materially to the ease, economy, and expedition with which the processes are conducted.

The process of manufacture at these establishments is substantially the as that described as practiced in the best private dairies. Several de and modifications are, however, introduced, most of which are necessi a difference in the condition of the material employed, or by the larger qu operated upon, or grow out of the fact that time enough can be without neglecting other duties. In the first place, greater labor has bestowed upon the cooling of the evening's milk than would be had it carried only a few rods into the house, in order to reduce its tempera ciently to insure the absence of too great acidity in the morning. same reason there is rarely, perhaps never in summer, any need of incr its acidity by the use of sour whey. For several reasons, one of which is five or six hundred gallons of milk in a mass will not lose its heat so q as a small amount, it is set (that is, the rennet is added) at a lower in these dairies, say 82° instead of 88°, as in family manufacture. summer and autumn, when the milk has diminished in bulk more n portion to the solid constituents contained in it, cold water is somet to the evening's milk, which serves the double purpose of cooling it ducing its density to that of milk during the juicy flush of feed season and nearer the calving of the cows. Next, the amount of is a trifle less, so that sufficient coagulation is rarely effected in less t and inasmuch as during this time there is a tendency of the cream to tice has been adopted in some factories to stir the milk, or surface of it gently in motion until the action of the

ent the least thickening is perceived, however, the vat is covered and
tly at rest until thick enough to cut. In the cutting it is customary
ives with more than four blades. I have seen some with as many as
lades used for the first cutting, and for subsequent use it is common
ne with six blades. As already remarked, the making of cheese at
ries is proceeded with more leisurely than is usual in families. It is
k for all day, and no inducements exist to hurry through the pro-

at used in cooking the curd is raised very gradually, say at first only
d half or three-quarters of an hour later to 90°, and afterwards to 94°,
ver allowed to go beyond 98°. The cooking process usually occu-
ss than two hours, and much oftener three or four hours. When too
lity is present, and the manufacturer has only to choose between a
cooked curd and a sour one, he chooses the least evil of the two, and
ie process. Throughout the cooking the curd is handled with extreme
saving the loss of the butter from it which would be liberated with
sage. The lack of hurry and its attendant evils must be considered
advantages of factory work over private dairying, since in the latter
ways a very natural and almost an irrepressible desire not to expend
on the process than can be afforded or conveniently spared from the
alls of other household labors.

SIZE AND FORM.

nmercial point of view it is a matter of some consequence not only to
good article, but to confer upon it a satisfactory external appearance.
e size and form of cheeses are of importance in connexion with the
f the market where they are to be disposed of. The recognized
Cheddar cheese in the London market is about twelve and a half
ck by fifteen and a half wide. If made smaller, the same proportions
ved. The rule adopted in Herkimer county, namely, to have the
al to half the breadth is probably as good and convenient as any.
eese is more easily turned than a thin one; it presents less surface to
nd rubbed, or to lie in contact with the shelf, and when shipped to
more easily handled. The most popular size for factory cheese
ation during the past year has been from one hundred and ten to one
nd forty pounds. Most factories decide on the weight and form, and
nform to it as nearly as possible. The range is mostly from nine by
ten by twenty-two inches. At some a few show cheeses are occa-
ade, weighing from eight hundred to one thousand pounds, or even
eeses made for shipping south should be much smaller. Those
rom thirty to forty pounds usually give best satisfaction.

FOR SOUTHERN MARKETS AND LONG VOYAGES.

to produce an article which will keep in tropical climates, the re-
e, in brief, a smaller proportion of butter and a firmer texture. The
wn in New York market as English dairy or Goshen cheese, which
manufactured in private dairies in Litchfield county, Connecticut, is
racter, and has been principally sold to go to the southern States, to
Indies, and to California, and commands a good price. The method
ufacture, as I witnessed it at the farm of Messrs. S. W. & T. S.
Cream Hill, West Cornwall, was as follows: The evening's milk of
cows is strained into a vat two and a half feet wide, five feet long,
ig three barrels, and cooled by pouring cold water into a cast-iron
enclosing the inner one, which is of tin. In the morning the cream
f and the milk heated to about 90°. The morning's milk is added,

and annatto sufficient to give it an orange tint, (one pound, of good
suffices for a ton of cheese,) and rennet to curdle it in half an hour,
put in and well stirred. The first cutting of the curd was done by pu
downwards through the mass a square tin frame, dividing into columns of
an inch. The warm water in the outer vat was then drawn off and cold
put in its place. The curd was next further broken by hand, and as it
a portion of the whey was dipped out and heated to scald the curd o
preceding day. The curd and whey then remaining were dipped into a
strainer laid into a wooden frame and sink, from which the whey is carr
a pipe to the whey tub in another building. When tolerably firm, the
was cut in slices with a knife, the cloth drawn closely about it, and a
stone placed upon it. Here it remains for several hours, when it is
in a large wooden bowl until next day. While the curd of to-day wa
that of yesterday was first cut in slices and then run through the curd
order to divide it finely. This mill consists of a framework h
cylinders one above the other, both of which, as well as the sides near
studded with numerous small, sharp, steel blades, those in the lower cy
being much closer than in the upper one. The curd thus finely cut wa
put into a large tin tub, and the whey, dipped off for the purpose, having
heated as hot as the hand can bear, was poured over it, and the
thoroughly stirred with the hands. In about ten minutes the warm
removed and cold water poured upon it. As soon as cool, the water is
off and the curd salted; thirty-two pounds are then put into a hoop eleven
a half inches in diameter, and moderately pressed for two or three hours.
is then turned, the cloth changed, and again pressed till evening. The c
then removed, the edges of the cheese pared, and a cloth and band
thin unbleached cotton, made for the purpose, covering the whole
on, when it is returned to receive a heavy pressure for thirty-six hours
This makes a cheese seven to eight inches thick and about twelve inches broa
Curing requires two or three months, and they are generally sold
autumn. It would doubtless be improved, and the labor of manufacture gr
lessened, by the substitution of the improved vat, and by cooking the curd
the whey, as in the Herkimer method, in place of the labors of the second
as above described, carrying the process, however, a trifle further than
be needful to make an article to suit the London market.

The manufacture of an article less rich than the Litchfield cheese was commenced during the present year in Orange county, New York, by the factory system, making, at the same time, a considerable quantity of cheese butter. For this purpose the location and buildings are similar to others, except, in addition, there is required a cool cellar and a larger supply of ice. The milk comes from within a moderate distance, not exceeding two and a half miles, and on arrival is poured into tin coolers twenty inches deep and seven wide, which are set in a tank of cold water. The morning's and evening's milk of one day, except in the hottest weather, stand thus until the next morning, when the cream is taken off and churned and the skimmed milk made into cheese. Whenever practicable, the cream is churned sweet and the buttermilk added to the skimmed milk, which increases the quantity and improves the quality of the product. Ralph's vats are used, and the process of manufacture is in many respects similar to the Herkimer method. The chief differences are, that the skimmed milk is first warmed to about 90°, the buttermilk is then added, which somewhat reduces the temperature, and next the coloring and rennet. In cooking, the heat is raised to 98°, but the length of time required is shorter than with whole milk; longer, however, when buttermilk is used than when it is not. Usually the curd steeps in the whey only about thirty minutes, as otherwise the product would be too tough and hard. The amount of salt used is one-fourth less than for whole milk cheese, and the curd is salted in the vat

ead of being removed to a sink for the purpose. The form and size given these cheeses are quite in contrast to those made for the English market, pressed in a sixteen-inch hoop, four and a half inches deep, and weighing y thirty to thirty-two pounds—this size being found preferable to larger s for shipment to southern ports.

The success attending this style of manufacture has been so encouraging that already six or seven other factories are projected or under way on the same plan. Some of the results of the past season, from April 1 to November 1, seven months, show an average product of butter per cow 95 pounds, and of cheese 195 pounds; and it is proper to state that about a fourth of the cows had been used for three or four years past for the production of winter butter for the New York market, and so the yield was considerably smaller than it would otherwise have been. The butter is sent semi-weekly to New York in returnable pails or tubs, and the cheese sent weekly when thirty to forty days old. The average net return for the season, after deducting all expenses of transportation and commissions, was twenty-four cents and six mills per pound for the butter, and eleven cents and two mills for the cheese. Some single days operations were as follows:

"*April* 27.—1,746 wine quarts of milk; the cream churned sweet gave 115 pounds of butter and 239 pounds of cheese.

"*May* 26.—3,300 quarts of milk; cream churned sweet gave 210 pounds of butter and 550 pounds of cheese.

"*October* 19.—1,700 quarts of milk; cream churned sour gave 120 pounds of butter and 280 pounds of cheese. This butter brought 24 cents per pound and the cheese 13 cents per pound in New York.

"*October* 20.—1,776 quarts of milk; cream churned sweet gave 115 pounds of butter and 336 pounds of cheese."

BREEDS FOR THE DAIRY.

The selection of cows for the dairy is a matter of the first importance. A good cow is a better investment at $100 than a poor one at $10. Few persons make the difference in price, either when they buy or sell, which actually exists in value. The difference in value between good cows and poor ones was forcibly stated by Mr. Arnold, a dairy farmer of Herkimer county, before the Farmers' Club at Little Falls, as follows:

"The difference in the product of cows in different dairies, and often of those in the same dairy, is notoriously very great, even where the food is abundant and alike good. If examined carefully, it will be found to be the chief cause of difference in the profits of dairying. To illustrate, let us suppose a case. It often happens that one cow will produce three times as much cheese as another. The cows being of equal weight, and fed with the same kind of food, one may produce two hundred pounds, and the other six hundred pounds. Instances of this difference are not uncommon. It is evident that the one giving the greater quantity will require a greater amount of food; but the food and milk will not be in the same ratio. To make this plain, suppose it costs $15 to supply each cow with food sufficient to support the body and maintain animal heat for a year, and for each hundred pounds of cheese it costs $2 50 worth of food in addition. The first cow will require five dollars' worth of food extra to produce two hundred pounds of cheese, and the second fifteen dollars' worth to produce six hundred pounds. Let us compare these items:

"Cost of keeping first cow, $20; product, 200 pounds; cost per pound, 10 cents.

"Cost of keeping second cow, $30; product, 600 pounds; cost per pound, 5 cents.

"But the food which will support three cows like the first will only support two like the second, and consequently where thirty like the first could be kept, only twenty like the latter one could be maintained. Let us now set these two dairies and their products side by side and see how they compare, remembering that the cost of maintaining each is the same:

"First dairy, 30 cows; product, 6,000 pounds.

"Second dairy, 20 cows; product, 12,000 pounds.

"In the first only a quarter of the food is converted into milk; in the second one-half. Suppose cheese to sell for eight cents per pound, the larger dairy will work a constant loss to the owner, while the other will yield a handsome profit. Whether the exact cost of keeping or of the extra amount of food to produce a hundred pounds of cheese is accurately represented here or not, the principle is not invalidated. It remains perpetually the same in every imaginable case."

Another dairyman gives the following statistics of the facts re five best and five poorest cows in his dairy in 1857:

Five best credit by an average of 554 gallons of milk each, which realized, in butter and cheese sold, 11¼ cents per gallon		
Dr. to 2½ tons of hay, at $8 per ton	$20 00	
Thirty weeks' pasturing	7 50	
Two hundred weight of ground feed in spring	3 00	
Ten per cent. interest on each cow, say $45	4 50	
		35 0
Net profit of each cow		98 71
Five poorest cows credit by an average of 243 gallons of milk, which realized, as above, 11¼ cents per gallon		
Dr. to cost of keeping as above		
Loss on each cow		7 6

Five cows paid him a profit of $143 55, and five others involved a $35 25 during the season. His dairy of forty-three cows averaged 450 p of cheese each.

The object of the butter dairy is best subserved by cows which give milk. The difference in this regard is very great. Some which give moderate quantity will produce more butter than some others giving two much. The object of the cheese dairy is best attained by cows yielding tifully of milk of fair quality. The proportion of butter varies in milk an way from two to eight per cent. The proportion of casein in milk is uniform, being usually from three to four per cent. Consequently, as a rule, the more milk a cow gives, the greater the product of cheese; and n contain three per cent. of butter, cheese of very good quality can be de it, provided no loss is incurred in the manufacture. Yet it must be rem that every one per cent. additional of butter which the milk contains ad per cent., more or less, to the amount of cheese which may be produced it, and is a much greater gain on the richness of the product.

To illustrate this, let us suppose milk to contain three per cent. of butter, and four per cent. of casein. This would be seven pounds of solid matter to one hundred pounds of milk. This, with the water, &c., held with it, would make about ten or eleven pounds of cheese, and an addition of one per cent. to the solid matter contained in the milk would add a tenth, or from a tenth up to a seventh more, to the amount of cheese.

Good milkers are not confined to any one breed; yet some breeds furnish a much greater proportion of good milking cows than others. The excellencies and defects of our common or miscalled "native" stock are too well known to require much remark. This stock includes some excellent milking cows, as good as can be had of any other sort; and it includes a great many more which never pay for their keeping, and which eat the food and receive the attention that would have brought a handsome profit if bestowed on better ones. The only serious trouble with the good ones is, that they are not sure to transmit their better qualities, but are ever and anon "breeding back," and their calves often exhibit the traits of inferior ancestors. If such bulls be used as sires we can anticipate nothing in regard to their progeny but uncertainty and disappointment. Now, in such a case, what should be done? I answer without hesitation, let every such bull be utterly discarded at once; let every unprofitable cow go to the butcher or drover as soon as may be, and let the good ones be bred to a male of some fixed breed, possessing so firmly the desired properties, form, and characteristics that he is sure to transmit them to his progeny. A very simple rule this, and easy to put in practice. Its universal adoption would, before many years, result in a gain to be counted by millions of dollars.

The Jersey race of cows excels all others in richness of milk, and although
yield is not usually abundant, they deserve very favorable consideration for
butter dairy. A few Jersey cows in a herd, or a strain of this blood infused
gh it, leave their mark very distinctly in the richer color and more delicate
r of the butter produced. Wherever known, Jersey butter commands the
st price in market. I have not known of any instances where these cows
proved in the cheese dairy, and should not feel warranted in recom-
n them for that purpose.

richness of milk the Devons probably rank next to the Jerseys, and,
nem, do not yield abundantly; the efforts of most Devon breeders having
diverted away from milk, and towards the production of beef. Of late,
have been made by some to breed towards milk, and there exist families
nis race possessing highly respectable milking qualities. When a bull of
a family is crossed with deep-milking cows of the common, mixed sort,
progeny usually manifest a good degree of adaptation for the dairy, in con-
ion with the activity, hardiness, and other good qualities for which the
o are noted.

an y s past the improved short-horns, often called Durhams, were generally
a of excellent milking qualities, and some families in a remarkable de-
These, like the Devons, have, by most breeders, been directed towards
roduction of meat, and often at the expense of milk; but they have not all
alike in this respect, and some families continue to be highly esteemed
y qualities. In this respect, however, success chiefly follows their being
upon deep milkers of the common sort. The progeny in this case pos-
greater size and weight than grade Devons, or than grades of almost any
breed; they need better pasture and winter food, and when these are
ed them the returns are generally satisfactory.

Herefords are an excellent breed for work and for beef. There may be
kers among those of pure blood, but if so it has never fallen to my lot
e any of them. Some of the grades, when from good milking dams, pro-
pretty well, but as a general, and, so far as I am advised, a universal rule,
king properties deteriorate in proportion as this blood prevails.

The Kerry breed has been too recently introduced into this country for us
s with confidence of its merits; but, judging from what is known of it
d, it may probably prove valuable in sections where larger ones will
They are quite small, very hardy, easily kept, and for their size
largely of very rich milk. In 1858 Mr. Sanford Howard visited Ireland,
purchased in Kerry county five heifers and a bull for A. W. Austin, esq.,
Roxbury, Massachusetts. These I saw at his residence, with their
, and was greatly interested in examining them. They had increased
much in size upon the better food given them, being nearly as large as
mon cows; very symmetrical and handsome, and were represented as giving
e yield of very rich milk. Mr. Austin indulges the hope that they will
e a most valuable accession to the stock of the country, particularly for
e climates, and scant, hilly pastures. In some points they excel any cattle
previously seen.

Ayrshires originated in Scotland, in a section of moderate natural fer-
and similar in some other regards to considerable portions of New England,
rn New York, and northeastern Ohio, where dairying is extensively car-
They have been brought to be what they are mainly by means of
d selection for many years past, especially with reference to dairy
. Easily and cheaply kept, and very hardy, they yield abun
good quality; more in proportion to the food consumed than any o
re breed presents us to-day with a cow in most essential r
t might be reasonably expected as the result of fifty y
matic, persevering attempts to improve our so-called "

cows, by a continuous selection of the best-formed and deepest milker them to breed from, in order that dairy properties might become fixed so as to be transmitted with regularity and certainty. From what observat experience I have had, the opinion is substantiated that in most cheese sections the Ayrshire would prove more desirable than any other; but it not pay to introduce pure bred cows simply for their milk, nor is it nec Successful crosses and high grades are often fully equal to pure bloods purposes except for breeding. The males of crosses should never be l bulls, unless merely in place of worse stock; for, though not to be de upon to transmit their virtues, they do so sometimes, and so are prefer scrubs. There is, however, no real economy in employing anything s pure bred males for propagation.

For a milk or cheese dairy I would prefer Ayrshires to any other; a butter dairy I would be loth to dispense wholly with the Jerseys.

MANAGEMENT OF COWS.

Without attempting to describe the details of feeding and treati stock, I will notice briefly some of the points to be kept in view. No how good cows are, stingy feeding and shiftless management will so down the stock and dissipate all hopes of profit. "What is worth d worth doing well"; and what is worth having, is worth taking care of. is no worse economy than neglect of and indifference to the comfort and of animals from which we expect profitable produce. Care and attenti secure all we desire, while neglect will surely nullify all advantages facilities can give. Let us suppose the dairyman provided with a stock o cows; the next point is to bestow proper treatment, and to feed them well. dairyman can afford to do otherwise. Look at it. A cow is wanted to milk, and good milk. She cannot make it out of nothing. The more we want, the more material must be supplied to make it of. The reasoning a by Mr. Arnold, before quoted, with a slight modification, will meet this Be your cows ever so good, they must be supported; their own system maintained, waste must be repaired, respiration sustained, and, in a word, machine kept in working order; and it is only what the cow can be induce eat and to digest, over and above what is required for the maintenance of animal, which goes to make milk.

Milk is a secretion—that is, it is secreted or separated by the action of a gland, and mainly or wholly from the blood which passes to it. We know very little of the nature of secretion or of the forces at play in it; but we know the fact that certain glands have the power of appropriating parts of the organism or of the food, in order to produce certain fluids. As these secretions come from the blood, this fluid must be supplied with the necessary materials; for the mammary gland of a cow can no more make or separate something from nothing than any other apparatus or machine can do it. Milk is variable in composition, depending partly on the peculiarities of the cow, or of her glandular system, but largely also on the quantity and quality of food supplied. If the food contain much fatty and starchy matter, the milk will be richer and better than if these qualities be lacking or scanty. If the food be rich in vegetable albumen, or other nitrogenous substances, the milk will be richer in casein. This last rule, however, holds only up to a certain point—say about five per cent.—beyond which albuminous as well as oily foods only increase the proportion of butter in the milk.

Milk is liable to other changes than those produced by food or by any outside agencies subsequently to being drawn. In women we find that anything which tends to irritate or annoy her, or to produce an exhibition of anger, produces at the same time serious changes in or partial destruction of her milk.

We can observe this with more distinctness in her case; but similar causes oduce like results in the lower animals, and consequently every means should used to insure tranquillity in our milch cows. Everybody knows that n a cow is driven rapidly on her way home to be milked, the milk is less- d in quantity, becomes hot, and is more liable to sour. That portion of which supports respiration and animal heat is precisely the same which, not so used up, goes to form butter; and every cause which increases the idity of breathing diminishes the amount of butter the cow might other- yield. Cows should be driven as leisurely as they will walk, never ha- sed, annoyed, or irritated by man, boy, or dog. Harsh treatment of any and very sort has a very injurious effect on the milk, by reason of both mental nd physical causes.

The operation of milking should be governed by the same general rule; use ly kindness, and let the animal understand that she is approached with none friendly intentions. In ninety, and perhaps ninety-nine cases out of a undred, kicking and all other vicious tricks originate in disregard of this rule. lking should be done at regular intervals; as soon as the proper time comes, the cow is not milked she becomes restless. Let the udder be cleaned roughly, and, beginning slowly, let the process soon be as rapid as is con- ent with gentleness, and make it complete. The "strippings" are from five fifteen times as rich in butter as the milk earlier drawn. We cannot afford lose this; and, what is of more consequence, leaving some in the udder tends o decrease the secretion. Poor milkers dry up cows.

To provide against the effect of the almost certain deterioration of pasture uring the dry weather of July and August, there should be a good supply f succulent food in reserve, to be cut as required. Clover and oats furnish cellent green food; but the cheapest, and, on the whole, the best is green n fodder. Southern or sweet corn sown closely in drills or broadcast on d in good condition makes good food; allow an acre to every eight or ten ows. If not all required during summer and autumn, it furnishes an excel- ent winter fodder. Productive cows, if not fully supplied in the hot season, re liable to run down; and it will be found both easier and cheaper to main- ain condition than to restore it after being lost. Besides, if allowed to shrink ch in their flow of milk at this season, generous feeding subsequently, specially if the cow is with calf, will tend rather to lay on flesh than to restore he secretion of milk.

It will be found good economy to lay in a large store of roots for winter eeding. For this purpose the carrot and mangold offer many advantages. The first is the more nutritious, and on soils adapted to it, and with clean and ich culture, is easily grown. It is good from autumn to spring. The man- old succeeds better on clayey land and within reach of sea breezes; or if in interior, the land should have a dressing of salt some weeks before sowing seed. These roots keep late, and are best during winter and spring. If earlier they are liable to produce scouring. With good management and a fair season, the equivalent of from six to ten tons of hay can be grown on acre. Turnips give more or less flavor to milk, but to cows not in milk y may be fed with profit. If much rough or coarse fodder is to be used, ro are indispensable; and they are of great assistance even with good hay. quantities not exceeding a peck per day per head, they are of considerably r value than the mere amount of nutriment they contain, inasmuch as y assist the digestive process, and enable the animals to obtain more nourish- from the other fodder consumed than they otherwise would. When fed e freely we must expect benefit only in proportion to their nutritious , but this alone is sufficient to warrant extensive cultivation; and when efficacy in preserving the health and condition of animals is consid- neglect to supply them seems almost inexcusable. If condition be

lost during winter, little or no profit will be realized in the best part of ceeding season.

In early spring, as the cows come in milk, they should have libe ing—plenty of good, early cut, well-cured hay, with carrots or mangolds perhaps a feed of shorts or other grain or meal once a day. Oats ground together or barley and buckwheat meal will give a better flow o and conduce more to the health of a cow giving milk than Indian corn, seems to be of too heating a nature. One fact regarding pasture be omitted—which is, that dairy cows make heavier draughts upon them phates in the soil than any other farm stock. The amount taken up by supposing her to bear a calf and to yield seven hundred gallons of summer, has been stated by Professor Way to be as much as can be re by forty or fifty pounds of bone dust; and it may well be believed that mand such as this would be seriously felt in the course of years.

In Cheshire, England, it is customary to use bone dust on pastures to s the drain made by the dairy cows, and in some cases it has been found sary here also. I am not aware that suffering from "bone disease" is c in this country, but it has been a pretty serious evil in some sections. It to the absence of a sufficiency of the bone-forming material in the food; when the food does not furnish a supply the bones of the animal suffer; matter is absorbed from them, they become soft and yielding, and the poor c is with great difficulty able to sustain its own weight. Instinctively such mals crave bones, and if one be found it is gnawed and chewed as a sweet preferable to any other food. A temporary remedy is found in feed bone meal, but a far better one, and a permanent, is a sufficient dre crushed bones to the land. Of all manurial applications to pasture, none crushed bones, either for efficiency or permanency. They can be c crushed by pounding, or they can first be softened by the action of wet or hot manure, and be more easily crushed afterwards. Ashes are nex bones in value, as they contain potash and the phosphates also.

VALUE OF WHEY.

In the manufacture of cheese from milk there is a large remainder of whey, concerning the value of which some difference of opinion exists among practical dairy men. In private dairies there is little difficulty in feeding it out to the farm stock in a way to realize a fair value for its nutritious constituents. Sweet whey is good for young calves. Mr. Willard says:

"When a pint or more of buckwheat flour is added to sixteen or eighteen quarts of sweet whey it forms a nutritious food, on which calves will thrive almost as well as on milk; at least after one week's feeding on milk they can be reared on whey, as above, without detriment."

In Herkimer county the practice of feeding whey to cows instead of to swine seems to be gaining ground. On this point Mr. Willard says:

"Whey is also fed to cows giving milk, and with such good results that many prefer to dispose of it in this way, believing it to be the most profitable method. Cows soon become fond of it, and the increased quantity of milk pays better than feeding it to swine."

When fed to swine, the whey should always be given in connexion with other food, as alone it is insufficient to give profitable results, and incapable of producing wholesome meat. It is generally supposed to be more safely fed when partially soured. Its principal solid constituent is milk sugar. This is very valuable as food, but is unfit for an exclusive diet, as it does not contain all the elements indispensable to a healthy growth.

Swine, in a state of domestication, and as usually kept in confined and filthy quarters, are very liable to many forms of disease. It is difficult enough to grow wholesome pork with good and sufficient food, but when hogs are kept

ıths together on whey alone, as is sometimes done in cheese districts, ıt may be depended upon as particularly unwholesome, and is especially ıvoided. Fed, however, in connexion with bran or shorts, Indian meal wheat meal, whey serves an excellent purpose for swine, and adds con- ıy to the dairyman's income.

when the milk of a neighborhood is carried to a common centre within the radius of which is three or four miles, the question how to dispose whey profitably assumes a different aspect. When cheese factories were ırted great anticipations of profit from pork to be made of whey were ·d in. These anticipations have not been realized. Sometimes the of a factory purchased and kept hogs on his own account; sometimes he ıem in to board for a York shilling per week; but rarely have the re- ven much satisfaction. In either case the large piggery near by was a e from its exhalation of odors so readily absorbed by milk and so ill l to improve the flavor of cheese. If the pigs throve well without much eed, those who brought milk to be made up were apprehensive that too utter and curd escaped with the whey and was lost to the weight of the l product. If meal or other food was given in sufficient quantity to hem in healthy condition, the cost materially reduced the amount re- for the pork. In some cases, where clear whey has been fed without ther food, the swine have died off by scores, the owners supposing this lue to some new disease of doubtful origin, when, in fact, it was merely tarvation, or what is equivalent to it, namely, food abundant in supply, icient in those nutritious properties which, from the nature of the case, ispensable. Whole milk is probably nearer than any other known sub- to a perfect food, but when its oil and its casein have been removed it ry different article, and a very imperfect food.

rder to understand better the problem of utilizing the whey of cheese s, let us inquire more particularly what whey is.

n rennet is added to milk its casein is coagulated and a curd formed. urd holds the oil globules or butter of milk with it mechanically. If the uent operations are conducted with care, the whey contains just what the id, minus the butter and casein, or nearly all of it, and the whey is and clear, but usually more or less of both butter and casein escape into ıey, which is thus rendered turbid. With the average management in re deemed good dairies I suppose a tenth of the butter and casein of milk are the whey, and there are dairies where a much larger proportion escapes. reason why the whey of factories has been no more satisfactory as a ; material may be that it contains less cheese. Whey contains the so- salts of milk, that which appears as ash when milk is dried and burned. mounts usually to from six to eight tenths of one per cent., about half ch is phosphate of lime. A careful analysis of five samples of whey, re- from a careful manufacture of cheese, gave an average result as follows

.....	93.12
.....	.35
.....	.47
ıen	.38
ugar	4.54
acid	.45
.....	.69
	100.00

whey be utilized, or at least the milk sugar which it contains? Sup- ınly thirty factories to have been in operation during the past year;

that each had an average of four hundred cows, each yielding four pounds of milk, enough for about four hundred pounds of che of all would be forty-eight millions of pounds, and the usual per-ce found in milk would amount to upwards of two million pounds, or thousand barrels. In a factory employing the milk of one th and cow posing them to yield twenty pounds each, and the milk to yield milk sugar, the daily product would be eight hundred pounds. To albumen from the whey it would only be necessary to raise its tem erature the boiling point, when the albumen, together with about all the bu in it, would separate and leave the liquid clear, and this, when ev the proper point, would yield prismatic crystals of lactose. Wh method of evaporating the liquid might be, so as not to convert it int acid, whether with an apparatus similar to that used for the juice of or by the use of the vacuum pan, such as sugar refiners use, or by o is a matter to be tested by trial. The albumen and curd first separ be very desirable food for swine, at least, and might likely enough be other purposes.

Lactose, or milk sugar, is less sweet to the taste than cane ar. Its cipal use at present is as a vehicle for homœopathic remedies. It than cane sugar, requiring five or six parts of cold water, but c ivin readily in boiling water. It is less susceptible of alcoholic fer by boiling in dilute acid it may be converted into fermentable r. the presence of an albuminous ferment its solution rapidly passes acid, as when whey sours spontaneously. Its chemical compositi H. 12, O. 12, and varies but slightly from cane sugar, which is C. 12, H O. 11.

What might be the market value of milk sugar, to what extent it substituted for cane sugar, and what other uses it might serve, are at p merely matters of speculation. It has been manufactured to some ext Switzerland, where it is an article of commerce.

AGRICULTURAL MACHINERY.

BY HON. M. L. DUNLAP, OF CHAMPAIGN, ILL.

THE increase of population, the deterioration of the soil by constant ping, and the demands for labor in other departments, have made a ne for improved modes of culture, and for the saving of manual labor. T only be met by improved machines and implements, by which the w be both better and more rapidly executed.

Aside from these considerations, the farmer must be relieved from t drudgery of hard and continual muscular exertion, such as mowing by and cutting the grain with the sickle and cradle; otherwise his sons will themselves to the mechanic arts, where steam does all the heavy work, s sawing, boring, turning, &c. The contrast between the labor of the that of the shop, without a corresponding advance in the mechanic s to the former, would become so great that no laborers could be obtain out greatly increased wages, and the agriculturist would soon find among the pariahs in the social scale.

a we cannot claim that farm implements and machines have kept in improvement with other departments of mechanics, yet such pro- een made within the last forty years as to place farming high in the , and has given it a position of influence and respectability second to Much of this is due to the common school, that great utilitarian that rubs the rust from dormant genius, and enables the lowest in r birth to make himself useful, and so carve out his own fortune, or ame high on the rolls of his country's fame.

thin the last fifty years the culture of the soil made little progress, g wore its ancient garb of weary industry, and wiped the sweat n-browned brow of labor with hands made hard by constant toil. ssons in farming were with the old wooden mould-board plough, the , the cradle, and the hand flail. The memory of the latter is still ith weary blows we shelled out the rattling grain.

e axe we helped to carve out a home in the deep forest, and in later broken up the matted sod of the wide prairies of the teeming west lough. This we began with the old strap plough; cut our hay from sloughs with the hand scythe; harvested our grain with the cradle nd rake; threshed it with an open cylinder, and hauled it to market agon, over roads whose sloughs and streams were unbridged. Since ning (a quarter of a century ago) the improvements in farming on whether in extent, in new modes of culture, or in new implements, nterpart in the world's history.

our purpose to follow these improvements through all their stages , but to give some idea of the machines and implements now used ure of prairie farms, with some suggestions of what we yet need.

MACHINES FOR PREPARING THE SOIL.

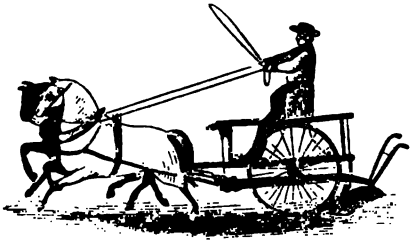
his head we shall treat of the common cast-steel plough, the gang e steam plough, or rather steam applied to ploughing, the rotary plough cultivator, the roller, and the harrow.

THE STEEL CLIPPER PLOUGH.

re now made with cast-steel mould-boards, with German steel shares, t-steel shares, cast in iron molds, are being tried, but not sufficiently opinion of their value. Instead of being sold at a cheaper rate, the een increased, thus putting them out of competition with the steel ich is now made with the wearing parts much thicker than heretofore ring them very durable. No other than a highly polished steel mould- gh can be used to advantage on the prairies, and a cast-iron plough, olished, is not of much value. The steel clipper plough, as now be considered perfect, so far as turning of the soil is concerned; but ils there is yet room for improvement.

amount of ploughing is done by farmers' sons of the age of fourteen upwards. To follow the team in the furrow, day after day, is very ork, and has the effect of giving the boy a heavy, awkward gait, by the lower limbs—a condition from which he seldom, if ever, recovers. y this, the plough should be made to run on wheels, giving the driver at upon which to ride. This can be done without extra power to s the wheels will relieve an amount of friction equal to the increased the driver and the extra gearing. We then have the increased cost lement to offset against the improved mode of handling it. A plough

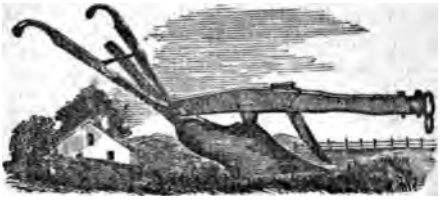
thus rigged can be run by a class of persons who cannot manage the plough, either from being lame, or from want of muscular ability to stan hard labor of travel over the rough ground, and the handling of the and team.



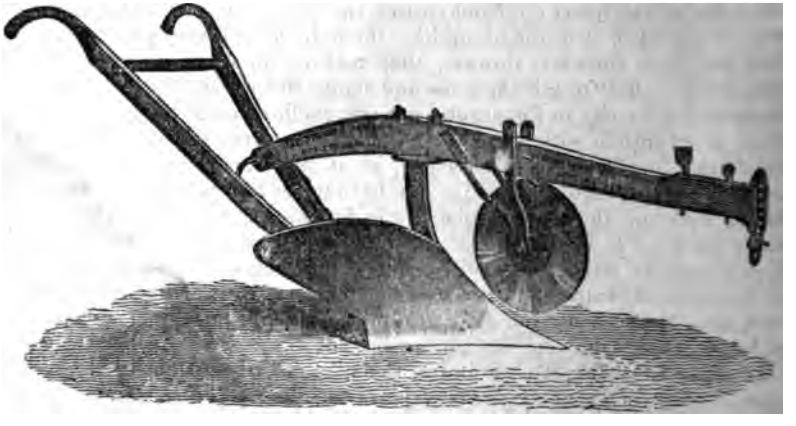
That a plough on wheels made to do better work we doubt. Several patents have sued for sulky ploughs, but, t none have proved practicable. eral devices or sizes of wheel been more or less used, or the plough itself, to relieve it tion, but none of them have general use. The next pro plough-making must be to give the driver a sulky seat.

GANG PLOUGHS.

Thus far these have not answered the expectations of farmers. heavy, liable to clog, and, though run on wheels, nothing appears to gained. A plough on wh can be drawn by two or three and of any width of cut fr to sixteen inches, would app desirable. The gang plou twenty to twenty-five inches aggregate, requires four h as one of these must walk o ploughed land, it is hard work.



observe some improvement of late in their construction that may tend t them useful. This mode of ploughing, by using the gang plough, to be with a trench or subsoil plough, will doubtless prove useful. Another experience is required to arrive at the merits of this mode of ploughing.



The old standing coulter has been thrown aside, and the rolling or coulter substituted in its place. This coulter is very useful in all ploughing, cutting through turf at little expense of power, and smooth, clean furrow. Another implement of value is the weed-ho

ed cut. In the south part of the State it can be made highly
ghing under weeds.

is made of a bar
inches by three-
ı inch, and bent.
with stirrups, as
outer end is so
runs in the open
draws all the
ornstalks into it,
re covered by the
rrows. For the
of a crop of clo-
ın grass, or buck-
luable. The lar-
eds can be buried

with its use. It will clog up with dead or loose rubbish. The
ırned must have one end fast in the soil.

wheat is cut about the 1st of June, and the stubble is soon filled
hich grow from four to six feet high before the seeding in Sep-
h this weed-hook these weeds can be placed in the bottom of the
sight, where they will soon furnish food for the young wheat
of being harrowed to the surface, as in the usual mode of plough-
aes a log-chain is placed on the plough-beam, so as to drag down
it this is a very imperfect process. We have used this hook with
ge in turning under cornstalks, especially when partially fed off
nter. In a fallow of dead weeds it will clog up and is useless.

Michigan plough has not come into general use in the west from
requires an enormous power to move it. No plough so thoroughly
soil as this; but so few of our farmers use ox teams, of which
ix yoke are required to run it, that the more practicable mode of
ıghs for trench ploughing is preferred. We have used this plough
ıtage in breaking prairie, by setting the upper within two and a
the lower one, and cutting the turf about one and a half to two
when it is rolled up like the half of a stove-pipe or scroll over
ver furrow is thrown; thus making an air space under the turf,
effect to kill the grass and aerate the inverted soil. The plough-
ne early in the spring, or open spells during the winter, when the
ırated with water. At such times three horses will break two
but if the ground is dry, as at the usual time of breaking, the
annot move it at all. We have never had turf so well and quickly
the above-mentioned winter breaking. In this case we need not
ost to be out of the ground more than to the depth of the plough-
ers not if the plough runs on the frozen ground, and only turns
ed stratum of three or four inches. In this way prairie can be
ime of comparative leisure, with less team, and in all respects
sults than is done during the hot days of July.

ıal value that we find in this plough is for the above purpose. In
l for grape-vines and other deep tillage, we use three teams; the
ommon cast-steel clipper eight inches deep; the second, a deep
ıes; and the third, a Mapes' lifting subsoil plough four inches,
stirring the soil sixteen inches deep. This makes a bed of loose
twenty inches, sufficient for all purposes. The furrow slice is cut
wide, and the three teams will thus prepare an acre to an acre
day.

THE STEAM PLOUGH.

Fawkes' steam plough has attracted the most attention at the wes it contains the idea of a traction engine to draw the ploughs after it, considered as a fair exponent of this kind of ploughing. This implen first tested at Centralia, at the State fair of Illinois, September 17, 18 than five years ago. The place of trial was on level land, baked ha summer drought; of course, just the condition to succeed with the engine. To this six ploughs were attached, cutting a foot each. Th was complete under such favorable conditions, and the crowd of attendance greeted it with rounds of applause.

The next public trial was at Decatur, Illinois, in the month of N There the conditions were less favorable. The ground was moist sloughs soft. The failure there was as signal as the success at Cen been two months previous. The difference between the level, sun-bak of Egypt and that of the friable clay loam of central Illinois was a and the people in attendance went home disappointed.

The next trial was made at Freeport, at the State fair of 1859, w engine and such improvements as would seem required to overcome culties found in the yielding loam of the northern prairie, but anot pointment followed. It may be well to mention that the committees to examine it reported warmly in its favor, and many of the newsp nounced it a success, but the practical farmers began to have doubts o success. The next week it was tried at the United States fair at (competition with Waters' steam plough. Neither of them met the tions of the people, and the laurels gained at Freeport by the judgment of the scientific committee were nearly lost.

The Illinois Central Railroad Company had offered a premium of a successful steam plough. The plough was to be tried at three differ The first point was on the writer's farm. The ground on which it was slightly undulating, uncultivated prairie, in all its native wildn part of an enclosed field on which no stock had been permitted to g getting to the field a soft, low piece of ground had to be passed ove land was not so soft but that a team could easily haul a ton over it weight of the engine sunk the drum so deeply into the soft soil th not be passed over by the aid of steam. This was the first serious that trial, demonstrating that the machine could not pass over low pr when the turf was unbroken, for the drum, so soon as steam was ap would bury itself too deep for extrication, though the same machine hauled over with other power with safety; thus showing that th engine can never be run over soft ground, whether from moisture or c

The amount of prairie broken in the course of some two weeks of about four and a half acres. The first attempt was made with eigh cutting a foot each, but four of these had to be taken off, and the without coal or water to run on the hard prairie over half a mile, (of the field,) was put to its utmost to do the work. The field had slope to the east, in the direction of the ploughing, with a grade, in more than forty feet to the mile. So well satisfied was the invent failure of the trial that no further effort was made as contemplated in land and at other points. Hundreds of farmers and mechanics v machine when on trial, but all went away disappointed. The inv further consideration, concluded that he could yet remedy the defec meet all objections, and another machine was made in one of the larg of the Union, and under the hands of superior workmen, but with success.

Waters, of Detroit, brought out the second machine, with which we good authority, he broke up nearly a hundred acres of prairie and a

enterprise. An inventor at Indianopolis, also, made an attempt with
ering knives* instead of ploughs, but met the fate of the others.
e may well come to the conclusion that ploughing with a steam traction
ıe is out of the question, for the following reasons:
This machine cannot pass over soft land, whether wet or cultivated, as
oil yields to the motion of the drum or driving wheels, and instead of
ing the machine forward, excavates a hole into which it sinks beyond its
power of rescue.
When loaded with a half day's supply of water and fuel it is incapable
awing the ploughs.
It cannot rise the ordinary grades of the rolling prairie with the plough
ırk.
On level land it cannot do the work as cheaply, under the most favorable
tions of water and fuel, as animal power.
England, steam ploughs appear to be gaining in popularity, and if we are
lieve some accounts, are soon to supersede, to a large extent, animal
r. Reasoning from analogy, many of our rural population, as well as
anics, are inclined to the opinion that the same result will follow here.
here are several reasons why this will not be the case. The condition of
ɔil, climate, comparative cost of labor, of fuel, and of subsistence, are too
to follow in the same path. The English soil is a stiff clay that requires,
ly, three to four horses to turn a furrow, and that must be a narrow though
p one. The dampness of the climate, the tenacity of the soil, and its
tion of moisture, make it imperative to have perfect drainage and thorough
ion to produce good crops. With us the soil is less tenacious, being mostly
y loam, is easily moved with a plough, and as the climate is warm and dry,
ıaturally well aerated; consequently, deep ploughing and under draining
ot so essential. After the soil is once broken up it retains the benefits for
g time, and shallow ploughing answers well for a series of years. The
t of this difference is that, in ploughing with us, less than one-half the
r is required to plough the same depth, or to have it thoroughly aerated
e same depth for a series of years.
ıe engines used in England are stationary, or movable along a headland,
lraw the plough back and forth over the field with the use of wire ropes.
is, of course, a slow process, considering the expense and power applied;
as labor is cheap and fuel abundant, while the cost of animals and their
stence is very high, the difference appears to be in favor of steam. An-
difference claimed is that the work is done better, which is doubtless
We have already shown that to stir our soil sixteen inches deep requires
teams, of two horses each, and a man to each team. This expense can
mewhat lessened with the use of a subsoil plough. But let us count the
with the three ploughs, so as to compare it with steam power on the prin-
of the English steam plough: Three (3) men and teams one (1) day,
ıg a furrow-slice eight inches wide, and ploughing one and one-fourth acre
en inches deep, at $2 50 each per day, $7 50, or at a cost of six dollars
cre. All orchards, vineyards, and garden lands ought to be thus prepared,
here can be no doubt that such preparation will pay for all farm crops.
ɔne such ploughing in our soil will answer for a long time, and the cost of
ɔquent ploughings will be half a day's team work, worth about one dollar
wenty-five cents ($1 25) to the acre. Theoretically there is no reason
steam cannot be applied to this kind of deep tillage on the English plan,
e the cost is not less than six dollars ($6) per acre. But in all cases where
ork can be done with a single team at the rate of two acres a day, which
ɜ usual day's work, we see no prospect of its ever coming into use. But

*Scooping and slicing the earth in horizontal layers in a peculiar manner.

we see other and more serious obstacles in the way of the use of ploughing. The first one is in the laws of descent, which divides divides estates, and has a constant tendency to crumble down acc capital that might otherwise become permanently invested in expe enduring fixtures and machinery. Under this law farms, as a ger will be small, and to a great extent worked by the owner and his sons. of the size that would require three teams could, in a few years, be at intervals of comparative leisure, scarcely feeling the cost. The outlay would be for a deep tiller plough, and a subsoil lifting plough, for both thirty dollars, ($50) which, if well made, would answer for a two hundred acres, at least twenty years for the purpose named, or at a cos a cent and a half an acre. The real cost in the case for deep tillage woul be over three dollars an acre, and its repetition once in ten years w ample. A farm of two hundred acres would not, therefore, invest in a plough costing $3,500—the lowest estimate for such an implement. Th on this, at six per cent., would be $210—a sum sufficient of itself to deep tillage of thirty-five acres a year, at the rate of six dollars an seventy, at the figure intimated above.

We will now consider the small farmer, who keeps but one team, and sixty acres. Three of them can unite their teams, and thus, in a few deep till the three farms in turn. We do not believe that, with the cost of animals and of subsistence, any farmer will find it profitable to steam for even deep tillage. The cost of the machine, the expense of a gineer, of fuel, of water, of repairs, (the last being enhanced by the from the foundry,) and the throwing out of work the hands thus e during the time of delay, make almost if not insurmountable bars to the able employment of the steam plough. It might be argued that part tomed to this kind of work would find it profitable to do job ploughing a acre. But here, again, we are met with the difficulty of the shortness of that they could find employment, as the land for a portion of the y in a condition to plough, and at others is covered with crops. We n down a hundred days that such a machine might find work, which, at nve a day, would amount to five hundred acres a year, which, at six doll acre, would be three thousand dollars. But as this is the highest cost to do the work with animal power, it is not likely that jobs would be let at rate, and from four to five dollars would be nearer the true figure. At dollars the gross earnings would be only two thousand dollars—a s would leave a small profit over the interest, wear and tear of the machine, cost of the fuel, of water, and of labor.

Take any view we choose of ploughing by steam, its bright side s ishes when we apply figures and facts to it. That steam can be appl ploughing has been demonstrated, but of its economy there are many g doubts; even in England we have not seen any figures that show a result. One plan we have seen proposed is to use a traction engine capable of running the ploughs on level ground; but in steep grades, to go ahead, cast anchor, and draw up the ploughs by a windlass. We have said sufficient on this head to show that this plan, which parties propose to put in operation, will prove futile. The land in the basin of southern Illinois approximates more nearly to that of England, and as the surface is more level, will be found the best adapted for the experiment of steam ploughing.

THE ROTARY SPADER.

Last autumn we gave one of these (Comstock's) a partial trial, t late in the season that we could form no definite opinion of its value, but highly impressed in its favor. Where used, the crop was much b

alongside, but this might have been the same by the use of the plough. our horses will spade the soil to the depth of eight inches and three feet wide, r at the rate of five or six acres a day. In this it promises to be a labor saving hine, but its great cost (two hundred dollars) is against it for the small mers. The idea that the soil must be inverted with the plough is fast losing ound, as it is found, in practice, that a thorough stirring or forking up is ually as valuable, if not more so, without the objection of having a hard, mpact bed under the plough. It is well known that the potash in the soil comes fixed when below the influence of the air, and in turning deep furrows free or aerated potash becomes buried, and is in turn fixed, while the crop t await the slow process of the atmosphere in aerating a new supply. In ding, the free and fixed potash becomes mixed, hence the plant has a good pply at the start, with more in process for assimilation. Another objection spading is the bringing of the seed of weeds to the surface to be ready to t with the seed sown. This, at first sight, might look like a serious objection, and, to some extent, is true. In old lands the seed of weeds becomes retty thoroughly mixed with the soil, and however one may plough or spade, good supply will be found near the surface to fill the whole space. In the of a very weedy piece of land the plough will be found desirable to place seeds of the weeds so deep that they cannot sprout up with the cultivated p. We may then safely consider in practice, in all well cultivated land, t it is immaterial whether we stir up the soil or reverse it, as far as the weeds concerned, while, as a mode of culture, the stirring is most decidedly best.

Should steam be applied to the tilling of the soil, we predict it will be by the use of the rotary spader rather than the plough. The experiment thus far is to spade to the depth of eight inches. How the implement will work to the depth of sixteen or twenty inches we cannot say, but at this depth it is not probable it will be found capable of so thoroughly comminuting the soil. In ploughing it is sometimes difficult to make the plough scour, but in the spader in question no such objection appeared in the way.

Should this new mode of stirring the soil ultimately come into popular use it will be by slow degrees, as has been the history of all new and valuable labor-saving implements. Nothing short of the most decided testimony will induce farmers to change an implement costing ten to fifteen dollars for one costing two hundred, with which to do the same work. The advantage must be largely in its favor to accomplish this.

TRIAL OF IMPLEMENTS.

Here is a point at which we can urge Congress to institute experimental grounds for the Department of Agriculture. Their value would be great, if for no other reason than to try all newly invented implements, and to carefully compare them with the old. This would save farmers a vast expense, and be the means of rapidly disseminating the really valuable implements throughout the country. This of itself would largely occupy the attention of practical men. Let us look at this a little further. Take, for instance, the steam plough, which has, up to this time, cost individually more than two hundred thousand dollars in the various attempts to make a traction engine do ploughing; nor do we believe the idea fully abandoned, for, unless the various implements and failures are published, the disease will break out in a new place, or, in other words, the same failures will be reproduced.

On such a farm the gang plough and rotary spader could have a thorough trial, and their respective merits be fully ascertained. But now we must await the slow process of individual experiment, or be at the mercy of interested parties, who send forth fancy sketches of imperfect trials to deceive us into the idea of

purchasing their implements. Such an institution would be a great benefit to inventors; for, if successful, it would establish at once a reputation, and, if unsuccessful, it would save further money and effort. But we have another object, which would be to give a detailed description and statement of the cost of the unsuccessful implements, so as to point out to future inventors ground that had been so unsuccessfully passed over. We now see, every old discarded ideas reclothed and presented to the public as new. Several of these have come up within the past year.

THE PLOUGH, OR TWO-HORSE CULTIVATOR.

No implement has so rapidly come into general use on the prairie as there one more deserving enthusiasm in its favor. It has already, to a g revolutionized the old system of marking off and check-row planting of has lessened the cost of this crop by a large per-centage, and wh the cotton fields of the south, will reduce the cost of culture more than and, at the same time, largely increase the crop. It has doubled the nu of acres that one man could cultivate with the double-shovel pl nothing of the ability to dispense with the hoe. It certainly cannot cotton fields, to be of priceless value. With its use hand-labor, except thinning of cotton, can be dispensed with almost entirely, and the crop improved by its use, as it will give the plant a much earlier culture than be given with any of the old implements. With it the scraping and hi done with two horses or mules, at a brisk walk, finishing a row at each through. We have given it a trial on three-fourths of an acre of cotton the most complete success. The same implements that succeed well in vating corn on our prairies will be alike valuable in the cotton fields south.

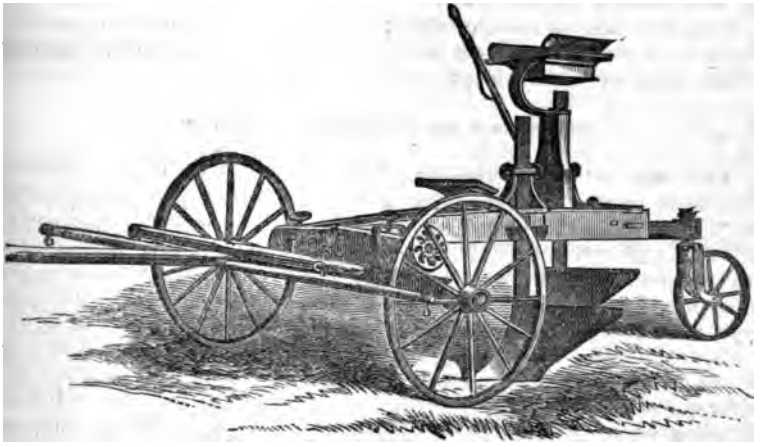
These cultivators are valuable for other purposes than the culture of and cotton. Among them is a great variety of patterns, and, while all of do good work in the corn-field, all are not so applicable to other p During the past season we have used four different patterns. One of which we have selected for next season's use, excels in its adaptability to purposes than the other, and, at the same time, is less liable to get out pair, or to have the cultivator standards broken, this last being one of fruitful causes of complaint against this class of implements.

Last autumn, having occasion to plant several bushels of peach and plum pits, it occurred to us that this cultivator could be used for the purpose. Driving it across the field, we soon found that it would make miniature furrows for the seed, which was dropped along them at the usual distance apart, when the implement was put astride the rows, and by passing twice over each row the proper depth of fine, well pulverized earth was put over them. With one boy to drive, and one to drop the seed, we accomplish in half a day what, before, had been several days' work for an industrious gardener. This has suggested to us that, with it, the potato fields can be marked out, and the seed covered in the best and most expeditious manner. We made the further experiment of ridging up for sweet potatoes, which was done, with the exception that the loose earth between the rows should be hauled to the top with a steel rake. The labor saved in these processes is not only large, but the work is, in all respects, better done. In the corn districts of this State this implement has nearly made good the loss of laborers who have gone to the army.

Nearly all of these two-horse cultivators have seats for the driver, and those that have not are becoming unpopular. A boy who can drive a team, yet is too slender to handle the shovel plough on foot; a lame person, who cannot walk to advantage; an invalid, partially recovered from sickness; or a young lady fond of driving, and who wishes to assist her father or brother, can do a full day's

rk with this new and valuable implement. When we come to speak of the row we shall have more to say of this implement.

THE DOUBLE SHOVEL PLOUGH.



The double shovel plough is an implement only known at the west, and is of ent date, say a dozen years. With its use corn culture dated as from a new . It will always prove a valuable aid on rough ground, among high weeds, small fields, and for small farmers, who keep but one horse, it cannot be aside. With us it has thrown out the old cultivators and one-horse ughs, which now lie idle in the tool-house. In the culture of small plants shield, something like those on two-horse cultivators, is used. This costs a trifle, and is valuable to protect the young plants from clods, or from be- covered up with loose earth. This shield is so made and arranged that most delicate plants are cultivated with this implement. The shovel can run close to the plant, and thereby save a large amount of hand-weeding. soon as the plants are strong enough the loose earth can be so disturbed ng the row as to cover up and smother out the young weeds, thus entirely ensing with hand-weeding, which at all times is both laborious and expen- e. The double shovel plough came of the old shovel plough, usually made the blank share of the old bull plough, and only used in new lands among ts and stumps. It was remodelled for the prairie of cast steel. The one came a pair on the same beam, but smaller in size. This was considered a at stride in the field of progress, but was soon eclipsed with a pair of double vels on wheels, surmounted with a driver's seat.

THE ROLLER AND THE HARROW.

The harrow, as a pulverizer and coverer of the cereals when sown, is of ient date, and has held out stoutly against innovation, but its days of use- ness have culminated, and it must hereafter take a less prominent place in farm economy. The grain drill in English husbandry has been its ongest competitor on the other side of the water, but the clean turnip fields stubble of the smaller grains give place here to cornstalks, small stones, mps, and other obstructions, rendering the grain drill of little value, and the ow has mainly had its own way.

n the clay loams of the prairie autumn ploughing has been of great value for t if not all crops. Without fall ploughing spring wheat cannot be grown.

This is a crop of great importance in the north part of the State, when process is always resorted to. In the central and southern parts of the where fall ploughing has not as yet obtained to any great extent, little wheat is grown, and in case of a wet spring the corn planting is much

We now propose to show another advantage of the two-horse cultivator how it will dispense with the harrow in connexion with the roller.

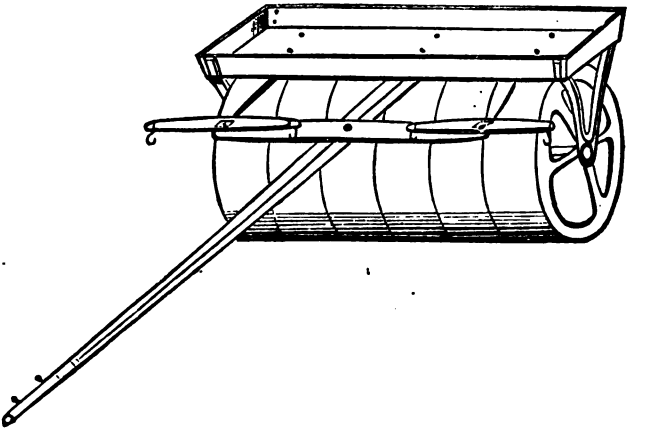
In the first place, we will suppose a rotation of crops: say wheat on ver sod turned over in August, to be sown in September with winter w or in February or March with spring wheat. As soon as the crop is ot stubble is to be turned over with the plough, or stirred up with the spade, say to the depth of seven or eight inches. This can be worked ov with a six-shovel two-horse wheel cultivator, at the rate of eight acres to the depth of four inches. This will pulverize and level the surface nicely prepare it for the seed, which can now be sown with a hand seed at the rate of twenty-five or thirty acres a day. Sow to oats, barley, or crops. Pass the harrow over this once, which will cover the seed, or if the land is in good order, the seed can be sown and cultiva pensing with the harrow. The roller will pulverize the small clods the soil on the seed so that it is sure to germinate. The seed will c even and make more rapid growth, thus largely increasing the crop ove old process.

We always have a few days of good weather early in the spring, and if land is ploughed the seed can be sown, but if neglected the ground be too wet to plough, and the crop is sown so late that a light crop is the r *We must have the benefit of the spring rains to insure a good crop of the cer* and with the use of the two-horse cultivator and roller we can have it it we will but plough in the fall. The stubble of this crop is again ploughed tumn, and the ground cultivated as before for corn. Of course, this the farmer to get in his crops early, by which he insures a good crop almost every subsequent contingency. In this crop we use no harrow. as the fall the corn is cut close to the ground, or the stalks are cut during winter at the surface with a hoe, raked up, and burned. We should ne feed stalks in the field and have our land poached up with cattle. The six-shovel cultivator, by adding two extra shovels to the one before mentioned, is now all that is required to prepare the corn stubble for spring wheat or barley, which is cultivated in at the rate of six to eight acres a day with the use of two horses, nearly double the amount that can be done with the harrow, and in a much superior manner. This is followed with the roller to level down the loosened corn hills and to closely pack the soil on the seed. Clover and herds grass can be sown with this crop to be mown or pastured two years, when it is to be broken up at the close of the second year. This completes a rotation of two years in wheat and one in oats, one in corn and one or two in clover, making a five or six years' rotation, and without using the harrow more than once in the whole time, and even that can be dispensed with. The advantage of the fall ploughing and use of the cultivator in stirring up the surface that may have become packed by the winter's rain in all cloggy soils can be appreciated in all locations north of 42°, where the springs are comparatively short, and south of that point where it is an object to take advantage of the spring rains, so as to have the crop advanced before the usual summer drought that too often makes the failure of the crops a rule rather than the exception.

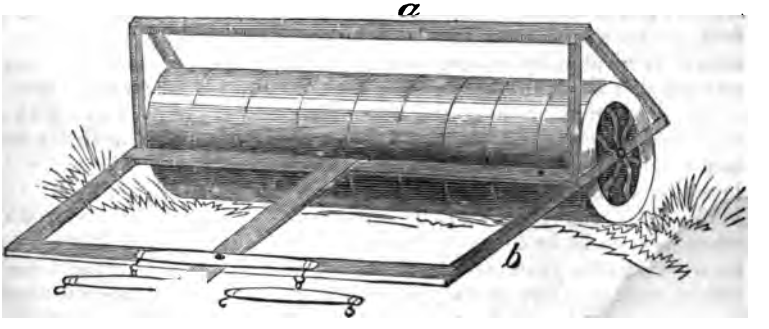
It will be seen that the two-horse cultivator can be made to play an important part in the culture of small grains, not only in the saving of labor, but in the increased yield.

THE IRON ROLLER.

iron roller, as sometimes made, is an implement of torture to the team of use. The mode of applying the team is the most unscientific pos- The draught should be from the centre of motion instead of from the top. board seat, e length of r, should be above the y the use irons at- o the end- the frame, the driver on either in the mid- his will en- n to drive ine, which necessary corn-plant- ed in com- , so as to



id roll the cornfields at one operation, which can be done at the fifteen acres a day. The value of the roller has been too long over- partly from the mode in which it has been constructed. The best made of cast sections of a foot wide and twenty-two inches diameter, g, including frame, about one thousand pounds, and costing some lars. On our prairie soils these are of great value, and in corn-planting ıely comminute the surface, and by packing the earth on the seed, al- llower planting, which, in case of a wet, cold spell, will prevent the



m rotting, and in case of drought keeps this shallow-planted corn from in either case insuring a good stand. In the culture of the small s of equal value, encouraging a good stand and pulverizing the small ı the surface, giving the young rootlets an opportunity to make a ı wth. While clods reflect the sun, a smooth, thoroughly comminu

surface absorbs its rays, and thus heats up the soil so as to force
We cannot too warmly commend the use of the roller on all prairie s
We have purposely omitted the common and hill cultivators, ploughs, clod-crushers, (not rollers,) horse hoes, &c., as no longer o value on the prairies.

BROAD-CAST SEED SOWERS AND DRILLS.

Grain drills, except in clean, well-pulverized prairie soils, are of little their value on sandy and gravelly land we know nothing pe uy. winter wheat and rye grain drills may have some value, but of this w doubts. For spring-sown grain we have serious objections to the drill. The seed is buried too deep, and the surface is left too uneven; dition, the weeds spring up between the rows, and thus crowd out the stead of having the grain crowd out the weeds. Until it will pay to weed the grain crops we should never think of using a grain drill. A time it was supposed the use of the drill would insure a crop of winter and that its use was indispensable, but this theory has given way, and grain drill is little used in prairie farming.

Another advantage of the drill was the saving of labor in sowing by and in the economy of seed. This has now given place to a new inventio sowing by horse-power and by hand. With a good hand machine a m sow from twenty-five to thirty acres a day, as much as can be d with best two-horse broad-cast sower. Seed drills and cultivators are c but these succeed only in clean, level lands, and are too expensive to get out of order to be profitable. They are only used for a few days a year, and the interest and deterioration amount to more than the cost of a sower and the labor of sowing a hundred acres; hence they cannot, if cessful, prove profitable on small farms. In our soil the seed need have slight covering if the land can, as it should, be rolled. With a hand seed-sower the work is done better than that by hand, and equal to the best broad-c sowers, and, on the whole, it will be found the most economical. The demand is for the horse-power seed-sower, but farmers will gradually change. The hand sowers are generally sold at ten dollars each, but if for sale in stores a good profit can be made on them at five dollars, as the cost is less than three dollars each.

MACHINES FOR THE MEADOW.

We have never, as yet, seen a good combined reaper and mower, and would never recommend them thus made. If a farmer can afford but one, let him have either a reaper or a mower, and hire the use of the other. Our harvests are very short at the west, generally only two weeks; as the heat of the season hastens the late sown grain, making the crop lighter, of course, but bringing it forward nearly at the same time with the early sown; neither can we cut grain in the dough state, as in the more northern and eastern districts. The same is true of the hay crop, which is usually so far advanced as to make immediate cutting necessary, lest its rapid maturing injure it for food. A common reaper will cut ten to twelve acres a day of twelve hours, the usual time of harvest work, and a mower will cut eight to ten acres in the same time. To cut grass the motion of the sickle must be greater than to cut grain. If this is applied in the same machine to the long sickle and heavy gearing of a six-foot reaper, the strain on the machine is very great, and it soon gives out; whereas, in mowing, the gearing is much lighter, as the sickle, which is but a trifle over four feet, can be easily drawn by two horses, and is much more durable. The six feet combined reapers and mowers require four horses, and are much heavier, and will do but little more work in a day, at best, as there

always more or less detentions with them. There can be no economy in
s combining the two machines, and if the farmer will look at the state of
ts as they exist he will never be induced to purchase them.

The tendency of the farmer is to run after expensive implements, but he
not always count their cost and the value they are to him. Two hundred
es of grass may be said to be a fair estimate for the use of a mower in one
son. The cost of a mower is, say, $80. The interest, repairs, and deteri-
ion will be about twenty-five dollars a year, or about ten cents an acre,
uming the machine to last ten years. We know one farmer who cut twelve
ndred acres of meadow with four mowers the past season. These were
n by two horses each, and driven by boys of fourteen to sixteen years of
e. To have cut this amount of grass with combined machines would have
uired four additional span of horses and expert drivers in place of the four
ys. We do not think a combined machine would stand more than two sea-
ns' work at this rate, when the account would be as follows:

e of mower, at 10 cents per acre	$120 00
ur teams, 30 days each, 120 days	120 00
ur boys, 30 days each, 120 days	120 00
	360 00

Or, thirty cents an acre.

ur combined machines, $120 each	$480 00	
lf charged to reaping	240 00	
		$240 00
lf their value for one year		120 00
		120 00
s and interest		20 00
		140 00

Or, say twelve and a half cents an acre; but the difference does not stop
re:

st of machine	$140 00
ght span of horses, 30 days each, 240 days	240 00
ur men, 30 days each, 120 days	240 00
	620 00

Or a total cost of fifty-one and a half cents an acre—nearly double that of
e single mower. We think no one can cavil at the above comparisons. We
y the above deliberately, after nearly twenty years' experience with the
aper and fifteen of the combined machine and single mower. It has been
o much the practice with small farmers to own a combined machine, and as
ese are seldom housed the loss is a large one. Last season the cost of ma-
ines was much above the figures given; but as the patents expire they must
cheapened, even below the above figures. It is not so material that the
act price in making the comparison should be given so long as the relative
fference remains the same. We are glad to see a growing demand for reap-
and mowers independent of each other, and we trust that it will not stop
til the last combined reaper and mower is thrown aside as a dead weight on
operations of the farmer.

HAY RAKES.

The hand rake is now little used for any purpose, and not at all in gather-
the crops of hay. Revolving rakes are yet largely used for their cheap

ness, and on small farms will continue to hold a place for some time. On farms the sulky wire-tooth rake is fast replacing all others. With it and horse will rake and bunch twenty acres a day. The *bunching* saving of hand labor, as with it the windrow is thrown into heaps or of eighty to one hundred pounds, ready to be placed in cocks or loaded. latter mode is now employed, as with this kind of rake the hay is very compressed, and can be pitched nearly as well as from the cocks that stood one or two days to settle. The sulky rakes cost thirty-five to forty lars. The difference between the amount of work that can be done with kind of rake and the old hand rake is but another index to the progress age.

The hay fork, or patent pitching fork, is now largely used, both in and by a temporary frame or gin to unload at the stack. By the use fork barns can be built higher than formerly, and stacks are made higher, receiving the hay in much better condition.

BALING AND SHIPPING.

A large part of the hay now used in cities is baled on the farms or depots near the place of growth. Before the war large quantities were south to the cotton States, and now the supplies for the army are also requiring all the surplus grown. By the use of an improved press eight tons of baled hay can be put into a common box-car. As the baling c than a dollar a ton, and the rate of transportation by the car load is low hay trade has assumed important dimensions, and has become a pr item in rural economy. The cotton and the sugar States cannot grow tame grasses to advantage, and for all time to come must draw a large pr of their winter forage from the north.

HARVESTING GRAIN.

The cutting of grain with reapers became common in the west about ei years ago. A few years previous the old strap plough had given place to steel clipper; and this, with the reaper, stimulated the productions of cereals to a wonderful extent. Railroads soon came to the aid of ma the crop, thus giving the farmer most of his time to grow and prepare it. average distance to the depots may be assumed at eight miles, or an a of sixty bushels of wheat per day for one team to deliver at the place of ment. The harvesting of grain has not been so much cheapened been facilitated by these substitutes for animal labor and capital. In a of animal labor to the extent demanded, this has been important; for, w it, much smaller amounts would have been grown.

The first attempt to harvest with machinery was to draw the heads wi a cylinder filled with teeth, so as to thresh it as the machine moved forw the solid array of spikelets; but this was found to waste the grain, nor wo it answer except on fully ripened grain that stood up well; hence it was doned, and the reaper and header both entered the field at nearly the time. While the former has made great progress, and is found in all g growing districts, the latter has made little progress. Self-rakers have b added to the reapers, and binders are beginning to be used to some ex but for want of skill in their use, or for some defect of manufacture, they not given as good satisfaction as we had hoped. That they will yet we have no doubt.

Some years since, Messrs. Sylla & Adams, of Elgin, in this State, several reapers with platforms so constructed that three binders and the could ride. About eight acres a day could be cut and shocl by this The bundles were placed on a false platform as fast as bi cient had accumulated for a check, a spring was drawn

, the weight of the platform bringing it back to its place. We used
ıe for several years, and regretted that the manufacture was sus-
ıttempts are now being made in one direction to combine the auto-
and binders so that the former will deliver the gavels to the latter;
: aid of the driver and one hand, a six-foot swath can be cut and
ıe operation. As this will cut twelve acres a day, the cost of cut-
inding would be greatly reduced. One of the drawbacks to this
cost of wire, amounting in heavy grain to about twenty-five cents

ling machines have their friends, and, on large farms, have in many
iven good satisfaction; but as the great majority of farmers grow
hundred acres of the same grain a year, the large outlay for these
ı so great that they can never become popular with that class of
t has also been found in practice that if the grain is not fully ripe
heads are cut off, the grain will shrivel up, and, when placed in
iable to mould. To remedy this to some extent, the heads have
with straw attached from twenty inches to two feet long. This,
s adding seriously to the bulk, and to the labor of threshing. In
ırs an endless apron is so arranged as to carry the cut grain to a
is drawn alongside. It is now proposed to lower the cutting bar,
nge the apron that the cut grain shall be carried by this endless
leposited on a form on the platform, where two men alternately bind
les as they come to hand. The great labor of binding is in the
ım one gavel to another, and in stooping down to take it from the
this case there is no stooping, and as the gavel is on an open form,
clasped and bound. It can be thrown on to a false platform, as
tioned, thus saving a large amount of labor in shocking up.
ı we think practicable, and it must prove a great saving of labor.
ı will cut twenty acres a day, requiring one driver, two binders, and
ı shock up. Thus we have:

horses per day	$2 00
$1 50	7 50
e	50
ne	8 00
	18 00

ost of ninety cents an acre. As now harvested with self-raking
have for twenty acres:

horses, two days	$4 00
wo days, at $1 50	3 00
ıding and shocking	15 00
e	25
ne	5 00
	27 25

ate of one dollar and thirty-six cents an acre, a difference of nearly
r an acre. This to a farmer growing a hundred acres is of no little
and in the aggregate amounts to a large sum.

BINDING WITH WIRE TWENTY ACRES.

horses, two days	$4 00
wo days	3 00
wo days	3 00
four days	6 00
ents per acre	5 00
	25
ne	6 00
	27

Here, again, is the same result. With a hand-raking reaper the creased some three dollars on the twenty acres. It is probable that ten-foot header, to carry the sheaves for a shock, it may require an extr which will, of course, add to the cost, which may be set down at one acre.

TO HARVEST BY HAND TWENTY ACRES.

One cradler, eight days	
One binder, eight days	
Four days' shocking up	
Total	

Or one dollar and ninety cents an acre. With a hand-wheel rake fou can be saved on the above estimate.

Should the contemplated improvements succeed, the labor and ex harvesting will be greatly reduced. In the use of horses and mules charged their use at a dollar a span per day. Were it not for this we would be nearly idle, while now we make them largely assist in the field.

The cost of reapers is much too great, and the time cannot be it will be greatly reduced both from competition and in the ex patents, the fees of which now amount to over twenty dollars on ever and mower made.

THRESHING AND CLEANING.

We now come to the last branch of our subject. When a boy we with a hand flail, and have winnowed many a week's work with the If labor had been worth the same then as now, it would have cost over tw cents a bushel to thresh and clean our wheat. The horse-power th English origin, and at the time of its first appearance created no among the laboring population as infringing upon their rights. It posed to be a death-blow to the laborer who depended upon his wint support his family. Yet this English machine was but a sorry thr one of our improved ones. That was, however, one step out of the o track—almost the first attempt of genius to aid in the labor of the fiel then what glorious achievements has she not secured, and yet what yet open to her investigation!

It was a long time before separators and winnowers were attach thresher; but when once put into operation, they soon became ge now all machines have one or the other. In time straw-carriers and apparatus were attached, leaving most of the labor to the team. farmers owned their own threshers; but now they mostly belong to who go about threshing and cleaning grain at a certain price per bu for wheat and rye, five cents; barley, three cents; oats, two cents. thus threshed is ready for market, thus saving to the farmer the cost fanning mill and the labor of recleaning and screening, as was the within the last few years.

The stacking of the straw was an important item, so as to save it feed. This is now done by straw-carriers attached to the cleaning which deposits the straw on the stack. In feeding these stacks of stock are allowed to help themselves, making their beds on the lee s stacks in cold weather. We have wintered our stock at such st for several winters, and have never had them do better, without any but the straw, even when we have wintered them on shock corn husking.

As the great mass of farmers on the prairies have no ba threshing has great advantages. The farmer is at no ay

s; all he has to do is to furnish half the team, which is two span of
a hand to throw the bundles from the stack; one to cut the bands and
em on the thresher-table; one to look after the chaff and straw, and
aul off the grain to the bin. The owner of the machine furnishes the
eeder, and one man to attend to the bagging and measuring.

ers who have large barns generally own a different style of machine.
re called railway or tread powers, and are adapted to one, two, or three
Some of these have only separators attached, so as to separate the
om the chaff and grain. In this case the threshing progresses accord-
ie demand of the stock for the straw and chaff. Usually the machine
fourth or half a day at a time, according to the capacity of the floor to
straw. This mode of threshing, taking into view the value of the
id chaff for feed, is, perhaps, one of the most economical that we have.
achine is cheap, and being always housed, will last a long time. We
one that has been in use fifteen years, and which has cost little more
occasional set of wooden treads or "lags," as they are called, and to
arance is not half worn out. Two hands will do very good work with
nachine; but to work it to its full capacity requires four hands. In
, the grain must be cleaned with a hand fanning mill. With this there
or three advantages: the work is done at a leisure time of the year,
stock have the full benefit of the straw and chaff; the aggregate cost
hing is below every other mode.

ese horse-powers and threshers a winnower and straw-carrier is some-
tached, to do field or out-door work; and some large farmers use them
work. The farmer of two hundred acres, half of which he has in
ain, and who has a barn, will find this kind of thresher very profitable.
jection that formerly applied to these powers, in regard to the danger
ing the team when the band runs off the driving pulley, is now obviated
se of a patent brake that instantly stops the machine in such an event.
chines are portable, and can be taken out to the wood-shed or any
the farm, and are the most commonly used to saw wood for railroads
domestic use. They are also used for running hay or straw cutters,
shing and cleaning clover seed, grinding corn, and other farm uses.
re among the most valuable and durable of farm machines; but let no
n one unless he has a barn or other convenient place to house it. This
also holds good for *all* farm machines and implements. The annual
farm wagons, machines, and implements by exposure to the weather,
early pay the whole tax levied on the farms, both personal and real, in
te. Three hundred dollar threshing machines, one hundred and fifty
eapers, and ploughs innumerable, stand out to the sun, wind, and rain.
wood of most of these is of ash and pine, the deterioration is rapid. To
dd sleighs, wagons, and other farm implements, and the list will be
enormous. In most cases the damage by rust and rotting is much
than by use.

THE THRESHING OF CLOVER.

labor of threshing and cleaning clover is no small part of the cost of
v indispensable seed. In the first place, the heads are threshed from
w generally by treading with horses or oxen, and then are put through
-huller to clean the seed from the chaff. So tenacious is the chaff that
ten bushels of clean seed a day is good work. This requires two
nd one man. Machines are now being used to thresh and clean the
one operation, similar to that of other grain, by which about one-half
t is saved. These machines cost about three hundred dollars. It is
e that the same result will follow their introduction that has followed

the eight-horse power grain threshers, by placing them in the hands of jo who will thresh and clean the farmers' clover seed at a fixed rate per bus Anything that will tend to cheapen this seed will be hailed with deli must have a beneficial effect on the soil. Clover is the great renovater out soil, and nothing but the high price of seed prevents its more genera

Clover seed is saved from the second cutting of the crop, the first be for hay. This crop yields three to five, and sometimes seven, bushels o to the acre. The straw has some value for feed, and the residue makes excellent manure; but the cost of threshing, and the want of barns, has the great drawback to a more extended growth for this purpose. Pen vania, with her immense barns, leads off in this product, followed by leaving Illinois the lowest in the list—not from any intrinsic want in th but from lack of barns and machines to thresh the seed.

The prairies are best adapted to this seed; for it can be grown in as the ground can be made clear, or is so already, of Canada thistles, c daisies, &c. It is to be hoped that the new clover threshers and hullers have a good effect on the crops at the west. The crop of 1862 is set do a little over a million of bushels, worth probably, at wholesale, four and millions of dollars, of which the farmers of Pennsylvania received a mill a half, and those of Illinois but a hundred and twenty thousand dollars. time is not distant when this will be changed, and the prairie States be great producers of this seed.

DRAINING

This is an important topic for the west, and one that is beginning to a considerable attention.

MOLE DRAINS.

These drains are made by a broad coulter, armed with a shoe that pu the earth on either side, except the bottom, and forces the clay up into the made by the coulter, closing it for several inches above the mole. The filtering through the mole, gradually drains the land. It is chiefly used in new, wet, clay land; in fact it is of no value in a sandy or gravelly soil. In prairie sloughs it is valuable for its cheapness, and to procure water for making artificial springs that do not freeze over in the coldest weather. We one of them now, nearly four years old, which appears as good as when first made, furnishing throughout the whole winter an ample supply of water, we formerly had to use a pump for the greater portion of the winter. supply of water failed for the first time during the drought of last se

There are but few farms in the central and northern parts of the State could have these artificial springs. In the basin of "Egypt," (that part of Illinois lying between the Big Muddy river and the Terre Haute and Alton railroad,) this would not be the case, as the soil is of such nature that the water does not freely percolate through it.

We have used this drain to some extent in upland, or rather in the upland depressions, with very good results. As a drain for orchards and garden ground, it would probably be of little value, while in all clay meadow land it is doubtless valuable. Should the drain fail once in ten years, yet it will prove the cheapest drain that can be made. The prairie soil is very easily drained—that is, all that portion having a dark colored clay loam. One drain in four rods would be ample in most cases, requiring forty rods to the acre. This, with the mole drain plough, would cost, say fifteen cents a rod, or six dollars an acre; while a tile drain would cost over twenty dollars at present prices.

Tile draining has not been introduced to any great extent at the west, as the demand for tile has not induced their manufacture, and until the tile are made here little will be done. If we had the tile, a large amount would be used in draining cellars and house grounds, and ultimately it would extend to the

he orchard, and the lowest parts of the farm. In our friable soil, so of stone, one would suppose that the drains for tile could be nearly l with animal power. Several machines for this purpose have been t thus far none of them have been fully approved, or have had suffil to demonstrate their value. We think such a machine will yet be which will enable us to use tile drains at a small cost for the excavaıe trenches.

making of open drains, we have machines for doing it at a cost of ten cents a rod, making a ditch three feet wide at the top, one at the nd twenty-two inches deep. The power is applied to a capstan by :s, which cut some forty rods at one setting of the capstan. The soil on one side of the ditch. This could be improved, so that a double one of, say, five feet wide, could be cut. One team and two men cut ty to a hundred and sixty rods a day with this machine. The cost ıchine, with the necessary chains and rods, is two hundred dollars. per rod is the jobber's price for the work, or ten to twelve and a half luding board and feed of team. These machines can only be used in nd, in a wet condition, so that water will follow the ditch. Without machine will not scour or run free, and the soil must be soft, so that :s that cut the sides and bottom of the ditch can be easily drawn t. We do not suppose it would work well in cultivated land even t, as it needs the thick, leathery, matted turf of the slough to hold o that it could be carried by the mould board away from the ditch.

FARM MILLS.

ıeapness of corn, which is the principal feed for animals, both for fattening, has generally been so low, and labor, on the other hand, so t little effort has been made in this direction. Most of the mills used urpose are of cast iron, and are run by the use of a sweep. These, , only bruise the grain, and do not grind it so as to rupture the cells. ı be no doubt that there is economy in grinding corn and other grains when it can be done at a reasonable cost. To haul corn ten or fifteen pay one-fifth for toll, is doubtful policy; and yet, to pay sixty dollars that will crush only thirty to forty bushels of corn in ten hours, with of horses, has no great promise of gain. If we could have a cheap ın with a railway two-horse power that would grind five bushels and at the same time not require a set of new grinders every ', we might find it an advantage; but of the hundreds of farm mills ave seen, not one of them comes within our idea of what such a mill l can be made to do. A durable mill of this kind would be cheap at l dollars, and find a ready sale at the west.

SORGHUM MILLS.

ıre now made strong and durable. Some of them have feed aprons ırs to deposit the bagasse out of the way, when it can be hauled off ing or put in the manure pile. As a general thing farmers will do ıaul their sorghum to the steam works, rather than to work it up themır, as a rule, farmers should not become manufacturers, as it will be re profitable to give all such work into the hands of mechanics and ırkmen than to attend to it themselves. The business of the farmer nce and deliver the raw materials into the hands of the manufacturing

reat extent the progress of agricultural improvement is due to the l genius of the age. The drain of laborers from the farm to the army ı past three years has been nearly made good by the ingenuity of our who have given us wooden forms with sinews of steel.

MAIZE-PAPER AND MAIZE-CLOT

BY J. R. DODGE, DEPARTMENT OF AGRICULTURE

In the search through the vegetable kingdom for textile fibres, w of looking in the cornfields? Yet coarse textures of good quality, ma the husks (or "shucks," as often called) of Indian corn, can be seen Department of Agriculture.

And paper-making, an art very ancient, has levied upon the grasses bamboos, the tender inner bark of trees, asbestos, flax, cotton, and to cavernous maw of the insatiable printing-press has even stripped the his rags. But rags are getting dear; people, in these war-times, w formerly covered with them, have not one to their backs, and the p is compelled to seek a substitute. Straw, a product of our fields, its se profusely studding the area of every farmstead with an effect so picturesq golden, yet so generally and contemptuously cast under foot of cattle as only of speedy disorganization and subsequent food for living plants, w sought as a material for paper; and the experiment has only met with success.

The amount of paper consumed is constantly and rapidly increasing tity and widening in its range of uses, which are now so numerous as defy enumeration. For printing, writing, drawing, architectural de cigarette-making, parcel wrapping, and box and basket making, among it has long been valuable; and now it is invading the domain of cloth, n from the delicate counterfeiting of a linen collar for the neck of a n or w to the seemly substitute for a seamless bag. With so much infla n of issues, in so many forms, it is not amazing that the attention of pa should be turned to maize.

Nor is this use of corn fibre altogether original; there is a record o maize-paper establishments existing in Italy in the eighteenth century. quality of this paper is not stated. Recently one Moritz Diamant, a Boh suggested to Baron Bruck, Austrian minister of finances, a process for paper from maize. The imperial paper-mill at Schlögelmuhl, near V undertook the manufacture, under Diamant's direction; the pro cess quite satisfactory either in quality or cost of manufacture. His first for government aid was in 1856. After the unsuccessful experiment, w by ineffectual efforts to induce private individuals to continue the w made a second request of the minister of finance, fortified with recomm from judicious, practical men; and the experiments were continu not yet fully successful. To reduce the cost, a "half-stuff factory" w in a maize district, designed to cut off the heavy expense of tra the crude material. The product was so inferior that Diamant we heartened, absented himself, and was released from his position, lea question unsolved. The cost of this experiment was about $13,000, w been advanced by the imperial paper-mill.

The direction of the Schlögelmuhl paper-mill, not disposed to dis effort to make a good and cheap paper, continued the experiments, a to reduce the cost of production; and secondly, to investigate the o only the finest husks enclosing the ear, rather than the leaves of the

esult was, if not a material for paper cheap as rags, the discovery of a new capable of being spun and woven, and furnishing, in its waste, a cheap

:.

ıe endeavor to procure paper from unworn plant fibre was always met by eat expense; and the fact that cotton, hemp, and flax were first woven and , and afterwards converted into paper, suggested the possible conversion e new material into textures first, and paper afterwards, and led to the ıction of coarse cloth from the husks of maize. Thus the first process be- last, and the manufacture is yet in a crude and imperfect state, having experimented upon for only two years. It is not expected to compete fine linen, but is designed as a substitute for common flax and hemp linen, l-cloth, tar-cloth, &c. Specimens of crash are on exhibition at the Depart- of Agriculture, and oil-cloth which seems a perfect *fac simile* of the best oth of commerce. These specimens look well; their durability will be l by use.

ıree components are developed by the result of the process: fibres, flour- h, and gluten. The fibres are spun and woven; the "flour-dough," or tive element, has a pleasant taste, (improving poor qualities of flour by an xture,) is wholesome, and has the peculiarity of resisting putrefaction for hs; and the waste, consisting of gluten and broken fibres, is used for ng paper. Thus our Indian corn furnishes the ear, and this maize extract, food of man, fibres for his clothing, and beautiful paper from the shorter and gluten; and when the textures are worn, they are reduced to rags and erted into paper. The lower part of the stalks furnish fuel for the steam- r used in reducing the raw material to its separate elements.

ıe progress made in perfecting the manufacture of paper has of late been satisfactory. Evidence of this is abundantly afforded in the specimens ıtly received at the department from Dr. Chevalier Auer de Welsbach, tor of the imperial printing establishment at Vienna, and superintendent e imperial paper-mills at Schlögelmuhl, who has been unremitting in his s, which have been crowned with a large measure of success. Among papers are found parchment and document papers of great strength and ɔility; tracing paper of superior tenacity and transparency—an effect of atural gluten of the husks, rendering unnecessary the present expensive ss of its manufacture, and supplying draughtsmen with the cheapest ma- known; letter paper in various styles and in several colors, with a smooth ɔolished, but soft surface, which takes the ink kindly; "chancery papers" eat variety—in size, very heavy and durable; beautiful silk paper of several s, of wonderful delicacy in structure and finish; paper for the manufacture tificial flowers, in lilac, rose, blue, green, and brown, gossamer-like, yet g, weighing but six pounds to the ream; and cigarette paper, but little ier, weighing but seven pounds to the ream. Of most varieties, both ma- ı and hand papers are produced.

peculiarity of this paper, due to the large proportion of gluten it contains, rthy of mention. Placed with common paper in water, and left to soak the latter will fall to pieces by its own weight, the maize-paper, on trial, arly or quite as tenacious as ever.

price may be judged by the following specimens, reduced to our currency:

oyal chancery, 32 pounds, 20 by 26 inches, $4 16 per ream.
etter paper of different kinds, from 22 to 32 cents per pound. A medium specimen. ing 12 pounds to the ream, 17½ by 22½ inches, is valued at $2 40 per ream.
lower paper, weighing 6 pounds, $2 88 per ream.
-arette paper, 7 pounds to the ream, 19½ by 28½ inches, brown, $2 24; white, $2.
ɛ paper, 4 pounds to the ream, 14½ by 17½ inches, white, $1 60: yellow, $2 20 per

rawing paper, 16 pounds to the ream, 13 by 16 inches, $4 80 per ream."

The measures are Austrian, the pound being 1.2352 English pounds. fore a deduction of nearly twenty per cent. from the price per pound necessary in calculating the price by the English pound.

The extreme cheapness of the drawing papers is due to the great gluten contained in the material. It has a natural preparation for suc

The process of manufacture is claimed to be simple; the humblest ma can readily understand it with little instruction, and practice it with

The cost of the husks (and it seems that leaves are, to some extent, u is from 32 to 56 cents per 125 English pounds, (per centner,) or $9 per t the higher price, which represents more the labor of gathering than the of the material. This is, of course, in the locality of their production.

The cost of extracting the fibre from 100,000 centners (6,250 tons) is mated: for coal and other material, $15,705; labor, $6,400; interest $4,296; raw material, including local freight, $80,000; total, $1 tol. this add for laborers and repairs to swell the total to $109,496.

The product is 10 per cent. of spinning fibre, 19 per cent. of paper 11 per cent. of feed stuff, or 40 per cent. in all, leaving a loss of 60 pe The spinning stuff is worth $64,000; paper material, $72,200; feed $15,400; total, $151,600. Deducting the expenses of manufacturing, a of $42,104 is shown.

The interest included in the expenses is five per cent. upon capital which includes $6,400 for land, $12,000 for the building, and the rem steam boilers, washing and bleaching vats, steam-engine, pumps, pipe, c

This is a brief record of a persevering and highly successful series of ments in perfecting corn-paper manufacture. The process has been in this country, as well as in Austria and other European states; and a reward will doubtless be realized to its ingenious originators.

But it should not be understood, in this acknowledgment of the lab inventive genius of Austrians, that this country, the native habitat of " corn," has utterly ignored the value of this abundant fibre. On the c maize-paper was made in this country a full half century before the da manufacture in Austria. If the discovery was not advanced to ultim fection, it was because other paper material was cheap and abundant, a enterprises of too urgent and immediate importance to warrant sufficient remuneration. An American enterprise must pay *to-day*, as well a future.

In 1802 a patent was issued by the United States to Burgess All John Harkins, of New Jersey, for making paper of corn husks. patent was issued in 1838, for preparing corn husks for making paper, t Holland, of Westfield, Massachusetts. Others have since been issued 1860 for making paper pulp of corncobs alone, or cobs and husks toge

Whatever is hereafter accomplished, in maize-cloth or maize-paper, th try must have a large interest in it. Not only do we grow some six millions of bushels of corn, but it is believed, from the inspection of received from Austria, that our husks are of finer texture, and better to the manufacture of superior goods, either of cloth or paper.

THE ICE TRADE.

BY LEANDER WETHERELL, OF BOSTON, MASS.

It has been often said of Massachusetts that among her chief productions for export are ice and granite; and it is true that those engaged in the ice and granite trade of Massachusetts have given employment to many seeking labor, have grown rich themselves, and, besides, have in no way impoverished the State.

In 1805–'06 the ice trade was begun* in Boston by Frederic Tudor, then a young man. He has recently deceased at the age of more than 80 years, and was at the time of his death still engaged in the business entered upon when he was but 22 years of age, as he recently informed the writer. In 1805 Mr. Tudor made his plans to engage in this trade. He first sent agents to the West Indies to procure information, but finding no one willing to ship so strange an article, he was compelled, in 1806, to purchase a vessel, the brig Favorite, of 130 tons, which he loaded with ice from a pond in that part of Lynn, now Saugus, near Boston, belonging then to his father, and sent to St. Pierre, Martinique.

This first cargo of ice from Boston was loaded at Gray's wharf, in Charlestown, where the shipment of ice has centred ever since, it having extended both ways to other wharves. The first shipment of 130 tons was followed, in 1807, by another of 240 tons, by the brig Trident, to Havana. The first shipment was attended with a loss of about $4,500, and subsequent ones resulted in heavy losses. When the embargo and the war put an end to foreign trade, the ice trade had yielded no profit to its projector.

In 1815, after the close of the war, Mr. Tudor resumed the ice trade under a contract with the government of Cuba, which granted certain privileges and a monopoly, enabling him to pursue the trade without loss. In 1817 he introduced the ice trade into Charleston, South Carolina, where he continued it until interrupted by the rebellion. In 1818 he extended it to Savannah, Georgia, and in 1820 to New Orleans, where, also, it was continued until interrupted by secession. Meanwhile it had been tried again by other parties sending to Martinique and St. Thomas, but it failed. It was also tried by Mr. Tudor at St. Jago de Cuba, where, after a trial of three years, it failed.

The first shipment of ice to the East Indies was made by Mr. Tudor in May, 1833, in the ship Tuscany, for Calcutta, and since then Mr. Tudor has extended his business to Madras and Bombay. Previous to this the ice trade was chiefly confined to the originator of the business, though it had been engaged in to some extent by other parties, but it was abandoned as an unprofitable operation. In 1832 the whole amount exported was 4,352 tons taken from Fresh Pond, in Cambridge, by Mr. Tudor, and shipped by him. Down to that time ship-owners objected to taking ice as freight lest it should injure their vessels

*Isaac Sturdevant, late of Portland, Maine, stated frequently to a large dealer of ice in Boston that he was cabin-boy of the schooner Favorite that sailed from Portland in the winter of 1798–'99 freighted with wood for New York, and after arriving in port and discharging her freight, a gentleman from Charleston, South Carolina, chartered the ship Favorite, in the month of February, 1799, to take a cargo of ice, cut from a pond in New York, near Broadway and Canal street, to the city of Charleston, seven years before Mr. Frederic Tudor sent out the brig Favorite, loaded with ice, to Martinique. Admitting this to be true, it does not, however, derogate from nor invalidate the claim of Mr. Tudor as the originator and successful founder of the ice trade in the United States. To him does the honor justly belong, and to him is it most cheerfully awarded.

and endanger the safety of voyagers. The mode of constructing ice-houses necessary at home and abroad, was not then well understood. The same was true of preparing ships to receive cargoes of ice. The implements and machinery for cutting, transporting, hoisting into ice-houses, for storing, etc., ing, and lowering into the holds of vessels, &c., were to be invented. In 1832 great progress has been made in all these particulars. In 1836 parties engaged in the ice trade, and in other places, out of Boston, but success. "The facilities for cheap supplies of ice and low freights," said Mr. Tudor, in a report to the Boston Board of Trade in 1857, "keeps the where it began, and at the same spot for shipments, and this having been case for about fifty years, it is probable the century will close without removal, and the demand for ice meanwhile will constantly increase."

The ice trade has doubtless preserved the Calcutta trade almost exclusively to Boston, and would do so for China were that country in a quiet condition, added Mr. Tudor, whose freights paid to India for ice down to 1857 to from ten to fifteen per cent. of the earnings of the whole run of the ships and home again, and it is earned without cost or deduction to the charterers or ship-owners. So it is with vessels bound to the Gulf of Mexico, taking from 50,000 to 60,000 tons of ice annually, from which the owners derived, on an average, $120,000 freight money, the shippers paying the expense of loading and discharging the cargoes.

The following table will show the beginning and progress of the ice trade as near, says Mr. Tudor, as can be ascertained, dropping fractions, exclusive of the home trade of consumption:

1806, 1 cargo	130 tons.
1816, 6 cargoes	1,200 "
1826, 15 cargoes	4,000 "
1836, 45 cargoes	12,000
1846, 175 cargoes	65,000 "
1856, 363 cargoes	146,000 tons.

The exports of 1856 were made to Philadelphia and nearly every port in the United States south of that; to South America, the East and West Indies, to the English settlements in India, to Canton, Mauritius, and Australia. Since this statement, made by Mr. Tudor in 1857, the trade has increased and extended to other places. The mention of these ports will serve to give the reader some idea of the extent of the ice trade of Boston.

In 1847 the shipments of ice coastwise from Boston were 51,887 tons, and were to nearly thirty places from Philadelphia to Galveston, Texas. These shipments were made in 49 ships, 39 barks, 45 brigs, 125 schooners, making in all 258 vessels. In the same year, 1847, the ice shipped to foreign ports amounted to 22,591 tons, and was sent to the following places: Cuba and the West Indies, South America, Calcutta, China and the East Indies, and to Liverpool. These shipments were made in 21 ships, 24 barks, 38 brigs, and 12 schooners, making in all 95 vessels, which, with the 258 vessels engaged in the coastwise trade, make an aggregate of 353 vessels engaged in the ice trade, or partially so, in 1847.

The freights during this year, 1847, averaged, it is said, as high as $2 50 per ton, which would amount, on the 74,478 tons shipped coastwise and abroad, to $186,195. The cost of securing ice and storing it varies according to the season, and the expense of shipping varies also as the expenses of fittings vary required for different voyages. Taking all the contingencies into the account, the cost of ice on board a ship is estimated to average $2 a ton, which would give for the above quantity shipped $148,956. In 1847 upwards of 29 cargoes of provisions, fruits, and vegetables were shipped in ice to ports where otherwise they could not have been sent, as, for example, to the West

s and Calcutta, the invoiced cost of which averaged about $2,500 each, g an aggregate of $72,500. To these items may be added the profits of ade to those engaged in it, stated to be $100,000, making a total t of $507,651.

as has the ice trade had a tendency to increase the commercial marine of United States. Formerly a large portion of the vessels engaged in the ting trade from Boston sailed in ballast, depending for remuneration on ts of cotton, rice, tobacco, sugar, and other tropical productions, and often g to compete with vessels of other nations, which were freighted out and Ice has furnished outward freight from Boston to those places where ting vessels ordinarily obtain cargoes. Accordingly the ice trade has ally been an unsuccessful business to places where profitable return freights t be obtained, because in such places the charge on ice is so high. So, at ports even where it is demanded as a luxury, it can hardly be afforded those ports have nothing to export, so as to refreight the vessels dis- ing cargoes of ice.

preparing vessels for the ice trade formerly their holds were closed up sides with boards nailed to the joist or ribs, with double bulkheads fore ft, the spaces thus formed being filled with spent tan, rice hulls, swamp traw, wood shavings, or like materials. These spaces thus filled were greater s according to the season, length of the voyage, &c. The surface of the as covered with like material except tan. Sawdust is now used for long ges. It is placed immediately between the ice and the sides of the hold s ship. This material is obtained from Maine, where it was once value- but now has a commercial value. In 1847 4,600 cords of it were brought ston at an average price of $2 50 a cord when delivered.

e returns of the ice trade, including freight, are almost clear gain to our ty. But for this trade the labor expended on ice, the material for its vation, and the means for its transportation would not be needed. Thus business been created, a coastwise and foreign trade grown up, founded article of no value prior to 1806, now exceeding, probably, a million of s a year, as it had nearly reached that in 1857, as stated by Mr. Tudor. said then that $25,000 dollars were annually expended by several com- s engaged in shipping ice for shavings, sawdust and rice chaff. Planing- and saw-mills now find ready sale for shavings and sawdust.

1856 Mr. Tudor said in his last report that the average of freights paid s shipped at Boston was $2 50 per ton clear to ship-owners. Therefore, Mr. Tudor, they received from this trade in 1856 $365,000, and probably it unequalled in any other department of their business. Besides, rail- and wagons were paid $100,000; laborers, $160,000; towns for taxes privileges and ice in store, $1,500; and wharves, $20,000 to $25,000.

en there were 93 wagons and 150 horses employed in distributing ice in n and vicinity; 60,000 tons being thus retailed to 18,000 families, hotels, saloons, and factories. We have no more of winter-strained oil, it now better strained in summer by the use of ice. The coast fishermen use reat advantage in preserving their fish in the very best condition till they into port. Ice has become almost as important an article of consump- n families as salt. Once regarded as a luxury, it has now come to be s indispensably necessary to the promotion of health and comfort.

1847 ice was sold in Havana for 6¼ cents a pound, and the demand had creased from 1832, when 1,112 tons were shipped thither. In New Or- it sold for half a cent to three cents a pound, and had increased from tons to nearly 30,000 tons. At Calcutta, where ice was introduced in with a shipment that year of 201 tons, the price had never been above a pound, and in 1847 sold for 2½ cents. The export meanwhile had

increased 3,000 tons, 50 per cent. of which is ordinarily melted before the goes can be discharged.

The consumption of ice in Boston and neighborhood in 1847 was 27 tons, which cost $54.765. It retailed at an average price of about 13½ c per 100 pounds, making 27 000 tons to sell for $72,900, leaving a pr $18.135 to be divided then among the seven principal ice dealers.

As ice is used and shipped at all seasons, large ice-houses are requir store and preserve it. Exclusive of the ice-houses at Charlestown, in w ice is kept for short periods, there had been erected in 1847 and pre thereto—

At Fresh pond, in Cambridge, ice-houses capable of holding	86,732
At Spy pond, in West Cambridge	28,000
At Little pond, West Cambridge	2,400
At Wenham pond	13,000
At Medford pond	4,000
At Eel pond, in Malden	2,000
At Horn pond, in Woburn	4,000
At Summer's pond	1,200
Total	141.

In 1864 Mr. Addison Gage, of Boston, who has long been engaged i ice trade, furnished the writer with the following estimates of the quanti ice cut at the following-named ponds:

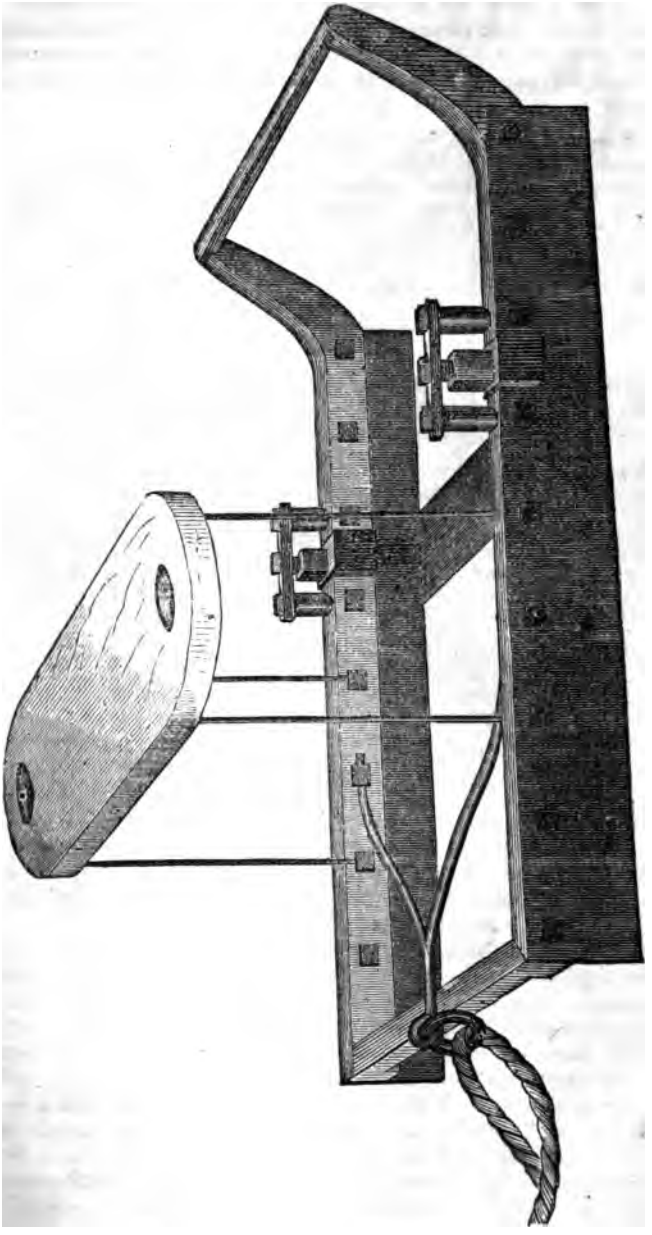
At Fresh pond, in Cambridge	95,000
At Spy pond, West Cambridge	75,000
At Little pond, West Cambridge	12,000
At Wenham pond	30,000
At Eel pond, in Malden	3,000
At Horn pond, in Woburn	15,000
At Smith's pond, in South Reading	10,000
At Quanapowitt pond, in South Reading	15,000
At Lynnfield pond, in Lynnfield	15,000
At Hackett's pond, in Andover	10,000
At Leach's pond, in North Chelmsford	15,000
At Sandy pond, in Groton	15,000
At Charles river, Waltham	5,000
At Hammond's pond, Newton	3,000
At Jamaica pond, West Roxbury	10,000
At Assabett pond, Assabett	15,000
Total	343,000

In the winter of 1847 $650 were daily paid for laborers and $2 horses. It was stated that on an average there are not generally mor twenty days in a season favorable for cutting and securing ice. Wag dollar a day at that time.

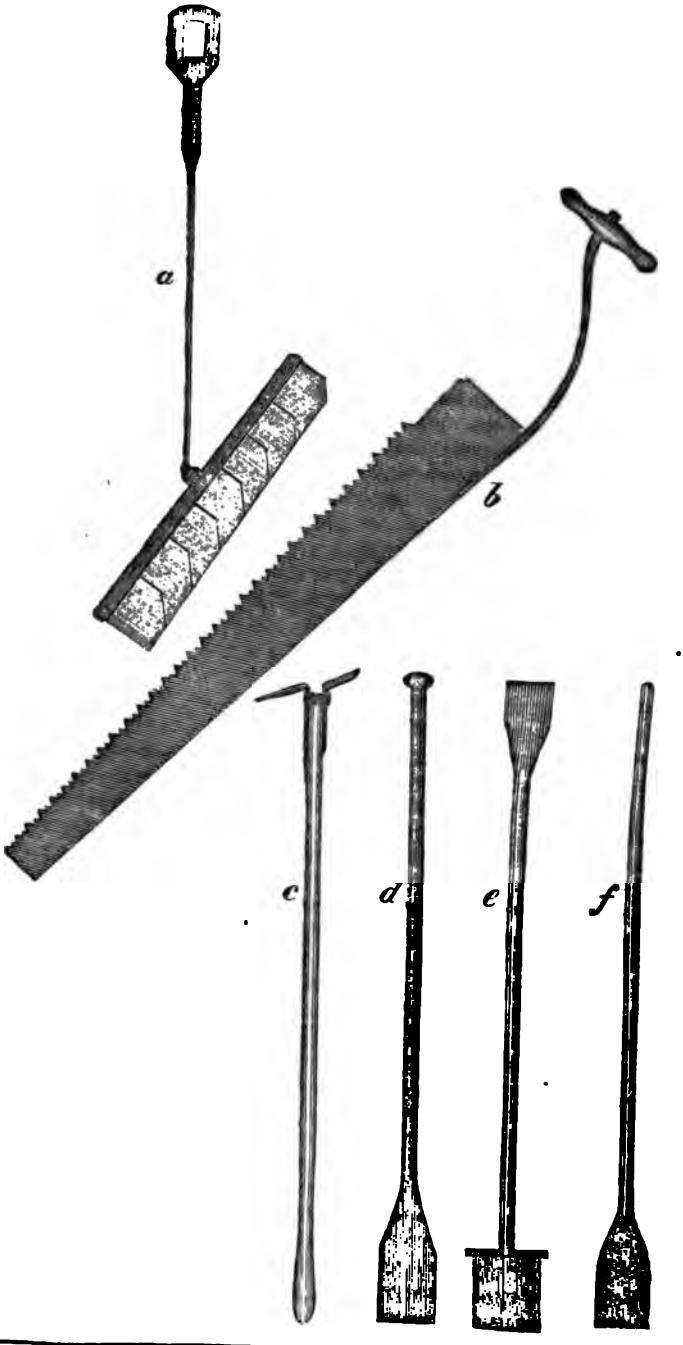
At the beginning of ice cutting and storing only farm implements were The business, however, soon developed the necessity for implements a chines for doing the work, which were supplied.

In 1847 more ice was secured in a day than would have been requi supply the trade in 1832. Ordinarily, before ice is formed of sufficient ness, snow falls, which, if the ice be four or more inches thick, is remov a "snow-scraper," in case the snow is not of sufficient weight to br water above the ice, but if it does, after being frozen, the snow ice is re by an "ice plane," which cuts about two inches deep and twenty-two in width. This machine is drawn by two horses, and is directed by in its guides into grooves before made by the ice-marker. The chips are in the same manner as dry snow. This is often attended with great ex and if the weather is warm immediately after, is a total loss; yet if

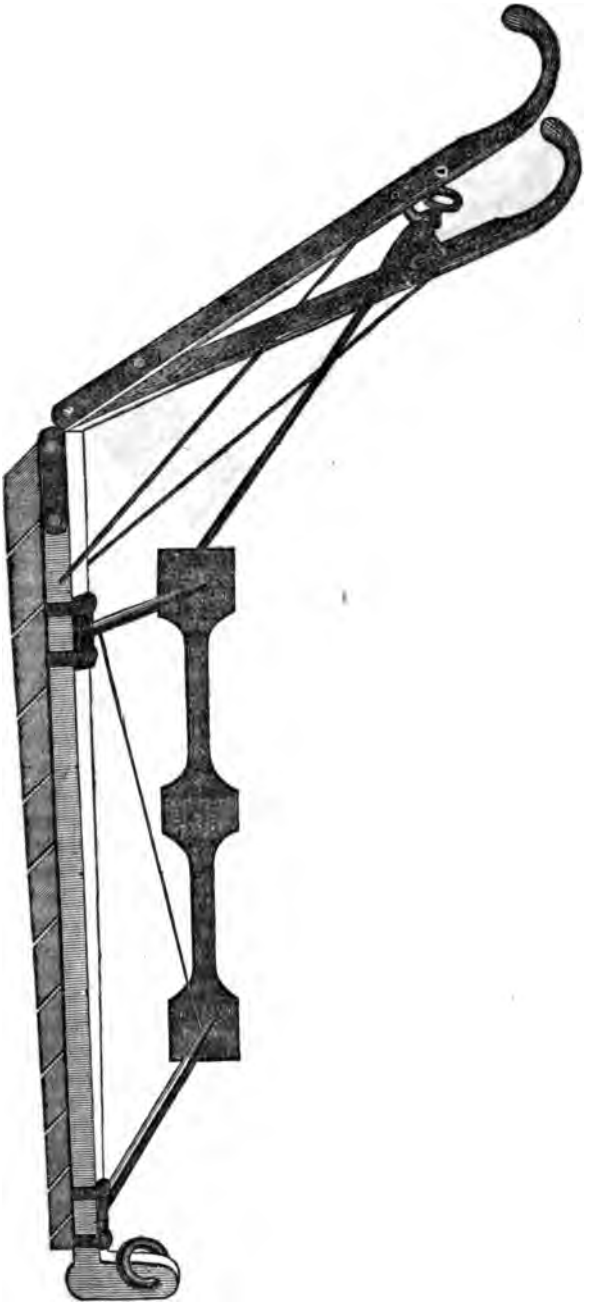
SNOW PLANE.



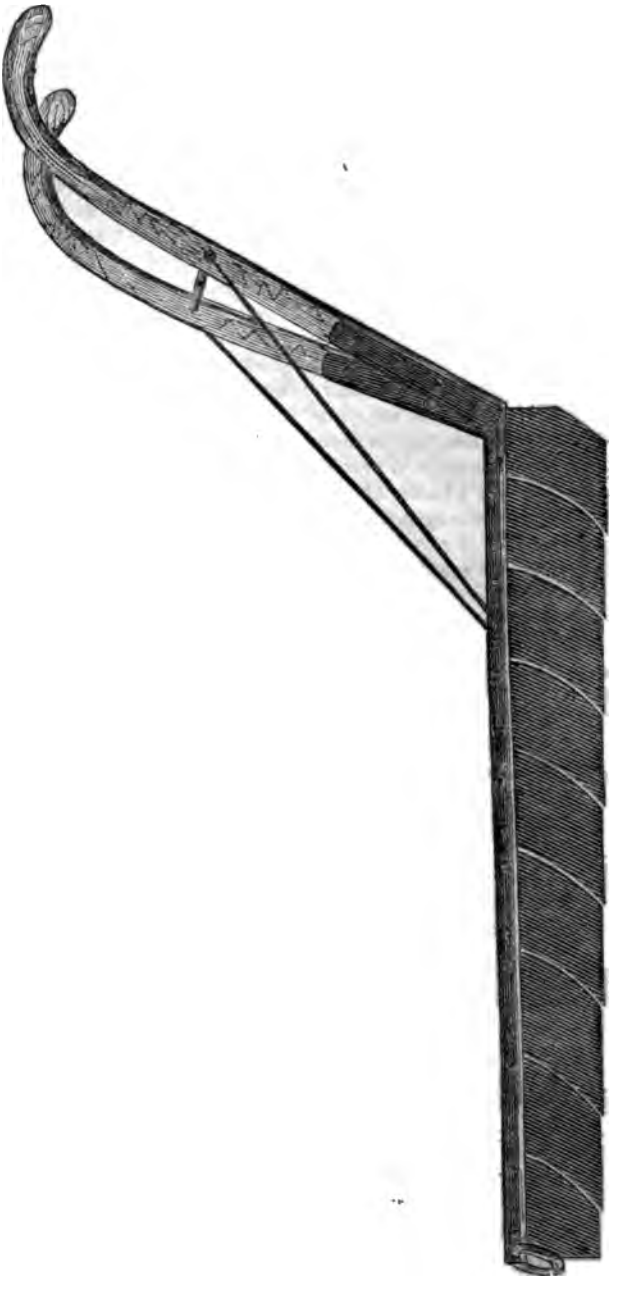
(a.) HAND GROOVE. (b.) SAW. (c.) ICE HOOK. (d.) CALKING BAR.
(e.) POND BAR. (f.) CHISEL BAR.



SWING-GUIDE MARKER.



EIGHT-INCH CUTTER.



ɔne, and the cold continues, there will be little or no increase of thickness
. One firm lately expended $8,000 in cleaning the ice for cutting. Ice
of sufficient thickness, and the snow and snow ice removed, first a
ht line is made with a hand groove with a straight-edged board for a ruler;
the swing-guide-marker is used, making parallel grooves twenty-two
s apart. When the ice is thick enough to cut, it is marked by parallel
twenty-two inches apart, crossing the former marking at right angles.
in every second line each way the six and eight-inch cutters are drawn,
g two-thirds through the ice; also the ten and twelve-inch cutters are
ɔyed when necessary. Then the lines where they intersect are calked
the calking-bar, where the ice is to be cut off, to prevent the water from
ng through the seams and freezing. Strips are sawn from twenty-five
y feet in length, two, four, or six deep lines in width, as convenient for
ıg, when the strips or sections, thus separated, are floated near the ele-
, where they are split with pond-bars; each cake of ice, usually 44 inches
e, is then passed on to the elevator or inclined plane with endless chain,
which it is passed under a plane, reducing it to a gauged thickness, leav-
vo projections or ribs on the top above the surface in order to prevent too
contact in packing—a consideration which greatly facilitates discharging
ır removal. It then passes under brooms which sweep away all loose
ːles from the surface of the ice, thus leaving it in the best possible condi-
'or packing use. When the ice-house or vault is filled, the ice is covered
shavings or swamp hay. When taken out, every block is hand-grooved
plit into four lesser blocks of twenty inches square for transportation,
ıer by ships, cars, or wagons. Some pack their ice in blocks twenty-two
s square, instead of forty-four inches square, deeming the former better
ɔmy. The modes of cutting, storing, and discharging ice vary somewhat
probably ever will. A block of ice twenty-two inches square and ten
s thick weighs 150 pounds, as stated by an ice dealer. Steam power is
ɔyed by some of the ice-cutters in lifting the ice from the ponds and put-
t into the ice-houses.

-houses are now built above ground and on the borders of ponds where
cut. There are about thirty-five ice-houses or vaults around Fresh pond,
ımbridge. They are ordinarily built contiguous to the pond where the
cut and stored, sometimes of bricks, but more commonly of wood. When
od, the walls are double, formed by two ranges of boarding, the space
ɐn the boardings outside and inside being filled with refuse tan wet from
ard. In tropical climes ice-houses are built with two spaces to be thus
with tan or other suitable material. One ice-house was built at Fresh
covering 36,000 feet, with vaults 40 feet in depth, with brick walls four
ıick, including two sets of air spaces. What has now been stated in re-
to building these ice-houses is sufficient to suggest to farmers and others,
may desire to build for private purposes, the best way of constructing
For this vicinity but one air space or filling is deemed necessary.

New Orleans, before the rebellion, substantial brick ice-houses had been
d at a cost of $200,000. Similar outlays had been made in Mobile,
eston, and other southern cities.

e consumption of ice in Boston and vicinity in 1857, as set down by
ıon, Gage & Co., was about 70,000 tons; in 1858, 74,000 tons; in 1859,
0 tons; in 1860, 85,000 tons; in 1861, 92.000 tons; in 1862, 105,000
and in 1863, 97,000 tons. The ice crop of the winter of 1862–'63, was
light, most of the ice used having been cut in March, 1863.

e freights for ice shipped coastwise in 1857 was $2 a ton; in 1858,
ɨ; in 1859. $2; in 1860, $3; in 1861, $3 50; in 1862, $1· and in
$2 50.

Foreign shipments for 1857, $6 per ton; in 1858, $5 50; in 1859, $5 50; in 1860, $6; in 1861, $6; in 1862, $7; and in 1863, $7.

These are about the average cost per ton for both coastwise and foreign shipments of ice for the years named above, as furnished by one of the largest ice companies in Boston. It has been as low as 50 cents a ton for coastwise trade; and it has been as high as $10 per ton for foreign trade.

Ice has been exported from Boston to New York city. It was done in 1805 by Addison, Gage & Co., for $11 a ton. The quantity of ice used in New York in 1855 was estimated at 305,000 tons. Rockland lake furnishes 120,000 tons; Highland lake, 30,000 tons; New Rochelle, 10,000 tons; Athens, 15,000 tons; Rhinebeck, 18,000 tons; Kingston creek, 60,000 tons; Catskill, 20,000 tons; Barrytown, 12,000 tons. The Knickerbocker Company store 113,000 tons of this quantity; the remainder being chiefly stored by four other firms. Albany, Hudson, Newburg, Poughkeepsie, and Troy, severally store annually from 10,000 to 30,000 tons. Syracuse began to store ice in 1844, and the quantity there used now is nearly 20,000 tons, mostly from Onondaga lake. Rochester and other cities in western and central New York have followed the example of Syracuse. The average price is 25 cents a hundred. Cincinnati and Chicago are chiefly supplied from the lakes, the former city receiving her supply from Cleveland. Places along the Mississippi are supplied from the neighborhood of Peru, Illinois. Farmers are building ice-houses over the country, and thus storing what ice they need for home consumption. Once they regarded ice as a luxury, but now they deem it a necessity.

In Newport, Rhode Island, about 10,000 tons of ice are cut and stored yearly. Mr. Daniel Cook, of that city, states that the ice business was begun there about fifteen years ago, at Lily pond. Mr. Cook puts up about 5,000 to 5,500 tons a year. No ice is exported, and ordinarily none imported, though last season was an exception, as Mr. Cook was obliged to ship some from Bath, Maine, and paid $15 a ton, weighed where it was shipped. He cuts blocks four feet square, elevates them over an inclined way by steam at the rate of thirty tons an hour. The pond from which the ice is taken is good water, as it is fed with springs.

Considerable quantities of ice are cut and stored in Maine; yet it is true, as said by an English writer, the ice trade is chiefly carried on by Boston and Norway; the latter country supplying the English market with ice at lower rates than can be done by Boston exports. Nearly $2,000,000 are invested in the ice trade of Boston and vicinity, employing about 550 ships, and giving employment to about 4,000 persons.

Though it is more than half a century since the ice trade was introduced by Mr. Frederic Tudor, yet millions in civilized society pine for the want of it in hot weather. It is almost a necessary of life, and we hope the time is not distant when farmers will gather their ice crop as regularly as their farm crops.

Mr. Everett, on one occasion spoke of the foreign ice trade as follows:

"When I had the honor to represent the country at London, I was struck one day, at the royal drawing-room, to see the president of the Board of Control, (the board charged with the supervision of the government of India,) approaching me with a stranger, then much talked of in London, the Baou Dwarkanauth Sagore, a Hindoo of great wealth, liberality, and intelligence. He was dressed with oriental magnificence, having on his head as turban a rich cashmere shawl, held together by a large diamond brooch, with another cashmere around his body; his countenance and manners were those of a highly intelligent and remarkable person, as he was. After the ceremony of introduction, he said that he wished to make his acknowledgments to me, as the American minister, for the benefits my countrymen had conferred on his countrymen. At first I did not know to what he referred. I thought he might have had in view the mission schools, knowing, as I did, that he himself had done a great deal for education. He immediately said, however, that he referred to the cargoes of ice sent from America to India, conducing not only to comfort, but health; adding that numerous lives are annually saved by applying lumps of American ice to the heads of patients in cases of high fever."

ıe ice exported from Boston is acknowledged to be of superior quality to from other localities. It is not as porous as most of the ice obtained else- e, and, besides, it is taken from clean, clear ponds of soft water, a con- ıtion too little regarded.

ıe antiseptic property of ice creates a large demand for this commodity in ern as well as in southern cities and towns.

alers in fresh meats and fish would not know now how to carry on their in the warm season without ice. Hence there is a large demand now e ıor such purposes; also for keeping butter and other perishable articles et. Vessels are no longer under the necessity of shipping live animals ıe sake of having fresh meat at sea. By means of an ice vault supplies e preserved for a long voyage. As a medical agent in tropical regions, ın from the report from India, it is deemed of the highest value, especially ses of fever. Its introduction there is deemed by the inhabitants a great ing.

ıchines for producing artificial ice have been invented, but it does not come n the province of this article to describe them.

ıce 1860, owing to the rebellion, the southern ports, formerly the ice rs' best markets, have mostly been closed to the ice trade.

1860 New Orleans alone consumed nearly 60,000 tons of Boston ice. while the home or local trade has largely increased, the consumption of ing not less than 100,000 tons in Boston and its immediate vicinity.

ICE SHIPPED.

ıe following statements show the custom-house clearances, with the esti- of the coastwise shipments, in 1858, as arranged from the Boston Board rade reports for 1858–'59–'60–'61 and '62:

8, to the East Indies and China	12,693	tons.
Cuba, South America, and other southern ports	24,262	tons.
Coastwise, United States ports	55,640	tons.
9, to the East Indies	14,031	tons.
Cuba, South America, and other southern ports	26,886	tons.
Coastwise, United States ports	88,486	tons.
0, to the East Indies	14,803	tons.
Ceylon	1,407	tons.
Cuba, South America, and other southern ports	29,042	tons.
Coastwise, United States ports	97,211	tons.
1, to the East Indies, Ceylon, and China	17,308	tons.
Cuba, South America, and other southern ports	25,517	tons.
Coastwise, United States ports	56,948	tons.
2, to the East Indies and Ceylon	17,416	tons.
Cuba, South America, and other southern ports	25,814	tons.
Coastwise, United States ports	34,872	tons.

e total exports of ice from 1848 to 1857 were as follows:

	57,507 tons.	In 1856	125,814 tons.
	66,308 tons.	In 1857	112,972 tons.
v	69,623 tons.	In 1858	92,595 tons.
1	99,578 tons.	In 1859	129,403 tons.
	96,482 tons.	In 1860	142,463 tons.
	82,572 tons.	In 1861	99,773 tons.
	115,315 tons.	In 1862	78,102 tons.
5	98,080 tons.	In 1863	133,000 tons.

y dealer in ice, both coastwise and foreign, says the coastwise esti- are greatly below the actual accounts thus shipped. The trade with ı ports not being required to obtain custom-house clearances, the amount ın shipped is left to be estimated, which estimates must, as in all si:ni- vary somewhat, leading only to the approximation of facts. With e at foreign ports the case is different, as stated.

DOGS AND DOG LAWS.

"Beware of dogs."—ST. PAUL.

OF all the family of the *Sanguinaria*, the genus *Canis familiaris* is u sally known and generally tolerated by man, while *C. lupus* and *C.* northern wolf and Asiatic jackal, the congeners, and, indeed, the or genitors of the dog, are universally execrated. From so detestable a the dog has won the affections of the human race by many instances of f and gratitude, creating a sympathy no doubt intensified by contrast of qualities with the meanness of his origin.

The dog, in the Bible, is synonymous with things unclean and and mean. Job, when derided, reminded his self-appointed tormentors their fathers were men whom he would have disdained to place with the of his flock. David, in the depth of his humiliation, when complaining had been brought to the "dust of death," and that his bones looked stared at him, exclaimed bitterly, "Dogs have encompassed me." And John, in his revelations, by way of antithesis to the blessedness of those tled to "enter in through the gates into the city," adds: "For without are and sorcerers, and whoremongers, and murderers, and idolators, and wh believeth and maketh a lie." The only scriptural mention of a benefit re from a dog is in the memorable case of Lazarus.

Dogs have been of great service to man, and few, if any, would favor extermination. Poets have sung their praises not alone in doggerel, but in alted numbers; and women have petted them from the earliest historic Children have fondled them, abused them with more or less impunity, cherished for them an affection worthy of a higher object.

A few dogs, well trained and good-tempered, might be tolerated. But they swarm over the land, making night dismal with their howlings, and ishing sleep from the invalid's eyes, when sheep are slaughtered mysteriously, and cattle are mangled, and when every month renews the horrible, sufferings of the victims of hydrophobia, it is time that sentiments feminine tenderness for a half savage brute should measurably va dog-cursed community.

When such a period has arrived, the usual and effective expedient to limit and restrain the evil has been taxation. England has long had a dog tax of twelve shillings sterling upon everything of the dog kind except the shepherd dog. Scotland and Canada have taxed them. Indeed, dog taxation in some form has been resorted to in every civilized country. Many curious police and sanitary regulations have existed. In Munich, Austria, each quarter is obliged to send all its dogs to the police on a certain day, twice every year. If found in health, the dog receives a ticket which he wears round his neck; if old or unsound, he is condemned to death. Any dog without a ticket is liable to suffer death. In this country there is an annual slaughter of the dogs in every city, in default of muzzling in obedience to municipal regulations. Such regulations are imperative, and would be made in self-preservation, even if a dog were a sacred animal, or surrounded by all the safeguards of special laws or constitutions. Despite all caution, every year adds many new cases of hydrophobia, in all sections of the land, to the list of that fatal, most dreaded, and dreadful of all diseases. One human life thus sacrificed could not be atoned for by the lives of all the dogs in the land.

WHAT IT COSTS TO KEEP DOGS.

id the reader ever count the cost of the dogs in the country?—the cost of
· keeping, the value of the sheep and other animals killed and worried, and
quarrels and lawsuits occasioned by them? Is it possible to estimate the
of hydrophobia in a single human subject? To the extent of their excep-
usefulness dogs should be credited; but what figures shall we place in
long account against them?

must be settled first how many there are. Did not our municipal author-
in cities, and the *magistri domi* of the country, sensible disciples of Mal-
as they are, restrain production, there would be *litter*-ally inundations of
s overwhelming the land every quarter, and they would represent every
ble grade of canine miscegenation—gaunt, lank-faced, and straight-tailed,
their northern progenitors, the wolf; voracious, mean-spirited, and unsightly
jackals from which some species have descended; and every imaginable
s of intermixture between the two types, and between the myriad sub-
es which were produced first by the modifications of climate and condi-
, and then permanently fixed by breeding.

t is an inexorable necessity, then, that this prolific and promiscuous race
l be curtailed of its excessive multiplications. How many do we tolerate?
nerations by assessors or other officials can show but a portion. Were
no total omissions or partial neglects in towns—in towns here and there—
census would only bring to light a portion of this wandering race. People
evade this premonition of a tax by judicious silence, by equivocations, and
a few of the owners of the lower class of curs (or the lower class owners of
s) by downright lying. Let these statistics be examined:

n Ohio the official enumeration of 1862 foots up 174.405 animals; that of
3, 183,167; intelligent members of the recent wool convention estimated the
numbers at 500,000. This would be one to every family, or one to every
inhabitants; the official census makes one to every thirteen. It is plain
t Ohio exceeds the estimate, often made by men capable of judging correctly,
it least one dog to every ten of the human population throughout the country.

ssachusetts had about 100,000 dogs in 1859; fully one to every twelve of
uman population—thirteen to every square mile—a very large proportion
a State made up of cities and villages, full of practical and sensible people,
it of them having no more use for a dog than for a real wolf or a veritable
l.

le Rhode Island has had 6,845 dogs upon its tax list—a fact which
ushes a very safe guarantee of a proportion fully as large as that of Massa-
tts.

n western and frontier States the proportion is greatly in excess of that of
o. In so old and thickly settled a State as New York it is also large. A
sus of dogs in Cayuga county exhibits among a human population of 55,000
less than 13,000 dogs, almost one to four, fully equal to the half million
mate of Ohio, which, as a central State of medium population, may fairly be
en as a basis for a national estimate. Now, Ohio has not exceeding one-tenth
he population of the States actually under federal authority. Upon the
st estimate for that State, the dogs of the loyal States would therefore
n r five millions. But to make a moderate estimate, which cannot be gain-
l, and which is probably less than the actual number, let us fix it at three
lions. What is the board of these three millions of dogs worth? In Wash-
ton, sportsmen's dogs, which are of medium size, and fairly representative
he medium feeding capacity, are boarded at two dollars per week. In other
ces the price is less. Throughout the country, taking the range of city and
ry, seaboard and frontier, the price of boarding varies from fifty cents to
dollars. If we acknowledge the possibility of profit in such boarding, and

accept the lowest price named—if we go further and make allowance fo
who feed their dogs on meat produced by themselves, and call it tw
cents per week, or the paltry doling out of a microscopic cent's wo
meal, the average cost of a dog's keeping for a year will be thirte

The assertion of a farmer that his dog's keeping costs him no
bear examination. Farmers who buy little, yet live well, do
their living really costs. Their surplus products find a ready mar
thing they eat represents the price for which it might be sold; no
price, but the home value. There is no need of waste in a family
keep a pack of dogs, or even a single dog; they will not eat vegeta
perhaps, potatoes saturated with grease, to prevent starvation;
an expensive commodity. Besides, this waste, of whatever ki
able and valuable for the pigs. Of so much cheaper material
pig than that of a dog, that comparison is scarcely fair; yet S. E
a well-known agricultural writer in New York, has estimated the
farmer of keeping a dog one year as equivalent to the cost of giving
of one hundred pounds to a pig. At present prices of pork, such a
be worth $10 at least.

Then, in view of the price paid for boarding dogs, the cost of
numbers of them in cities, their exclusive consumption of meat,
comparison with the value of "waste" fed to hogs, let the estimate of
five cents per week be reduced nearly twenty-five per cent., and let
be commuted at less than a cent per meal, and call the general average
out the land $10 per year; then the keeping of three millions of
loyal States would be $30,000,000.

The loss of sheep by dogs may be closely approximated. For a se
years, in Ohio, the average of ascertained damages was $111,548 per y
sheep were very low in price. In 1863 the ascertained loss was $144,600.
secretary of the New York State Agricultural Society estimates the los
York in 1862 at 50,000 sheep, worth $175,000. This is a larger loss
of Ohio with a less number of sheep. Higher proportional estimates
of Ohio have also been made for Maine. These are eastern States; the
States are still more exposed to the ravages of dogs. Then it is a mo
assumption to take Ohio as a basis for the country. As Ohio had 4,4
sheep in 1862, the loyal States 23,000,000 in round numbers, and the a
loss of that State was 40,764, the entire loss would be 229,102 in killed
a similar calculation upon the basis of 25,483 injured in Ohio would
total of 143,219 maimed. At the present prices of sheep, an average
entire country cannot reasonably be placed at less than $5, which would
the total loss in killed $1,145,510. The damage to the remainder has ge
averaged in Ohio about three-fifths of the value of the animal. T
make the total loss of sheep injured $429,657; total loss of killed and
$1,575,167. No addition is made for increase of sheep since 1862, (
30,000,000, instead of 25,000,000;) let the growing watchfulness of
terests and the increasing restraint upon dogs be allowed to counte
such increase.

The account against dogs, thus far made out, stands as follows:

Keeping 3,000,000 dogs	$30,0
Sheep killed	1,1
Sheep injured	4
	31,6

It is not considered unreasonable to make nearly as ge an
cost of litigation occasioned, for cattle bitten, hogs worried,

gardens injured, and other losses, as for damages done to sheep; and it
ne a much larger item. The entire cost of dogs to the loyal States may
be put down at $33,000,000.

sum of $33,000,000 may seem a small matter, yet it would pay nearly
present interest on the national debt; it would buy 165,000 farms, at
nt price for land, each year; it would support 165,000 farmers' daugh-
m boarding schools; it would purchase 132,000 neighborhood libraries of
volumes each.

HOW DOGS DISCOURAGE SHEEP HUSBANDRY.

We should keep more sheep about here but for the dogs." A statement
this should have silenced the wondering inquiry, "Why don't you keep
sheep?" in any portion of this country within the last twenty years. We
allowed the herbage of millions of acres to decay, and imported many
ns of pounds of wool yearly, because we chose to spend our substance in
worthless dogs with mutton, in deference to the lazy habits and silly
ices of a class who dote upon the companionship of a dog. A southern
cultural editor, disgusted with the popular partiality for a half-domesticated,
ory animal, once lamented that civilization was not there sufficiently ad-
ced to secure for sheep the favor extended to dogs; and his dislike of dogs
not lessened by seeing on many plantations more dogs in the pack than
were sheep in the herd, nor by receiving letters from subscribers saying
had "lost upwards of one hundred sheep by the depredations of sheep-
curs."

naps some sauntering hunter, stopping his accustomed pursuit of small
of sweet carols and insectivorous habits, for more ambitious forays, his
-piece instead of a Springfield musket on his shoulder, and a lank pointer
side, affects to doubt the reality of these damages. If his unimproving
has not destroyed his capacity for primary mathematics, let him note
of the facts and figures which swell the tide of testimony against the curs.
ssachusetts had 378,226 sheep in 1840, 188,651 in 1850, 145,215 in 1855,
113,111 in 1860, and about 100,000 dogs. The wool crop depreciated
ly half a million dollars in ten years—a tax of fifty cents per annum upon
dog in the State, *paid by wool-growers*. The State Agricultural Society
the key to this depreciation: "The returns which this society have re-
ed unanimously ascribe as a reason why no more are kept, the injuries in-
d by dogs." In 1860 the dog law realized $35,894 upon 32,707 dogs
sed, while as many more were killed to avoid the tax, and an equal num-
escaped by the connivance of negligent or dog-sympathizing officials. In
there were but 16,905 licenses. The dogs are now reduced one-half, and
ieep, in consequence, bid fair soon to be doubled. But the evil still exists;
ung man of this State who recently bought seventeen sheep, worth $10
lost thirteen of them in a single night.

Ohio, during five years ending in 1862, there were records of 203,824
killed by dogs, and 127,418 injured, involving a loss of $558,733, or
,648 per year, when the average price of sheep was scarcely two dollars
ad. Of course there were damages which were never collected, mate-
y swelling this aggregate. In twenty-two counties in Ohio a decrease of
than 300,000 sheep, in consequence of the ravages of dogs, between the
1846 and 1856, has been chronicled in the Ohio reports. Such items as
rom the Springfield Republic are constantly exhibited in Ohio papers:
y-five superior sheep belonging to E. B. Cassidy were killed by dogs a
nts ago."

tial canvass of twenty-five counties in New York, which were not the
wool-growing counties, showed that 6,000 sheep had been killed in
om such data B. P. Johnson, secretary of the New York State Agri-

cultural Society, one of the best authorities on agricultural matters in States, estimated the entire loss in the State at 50,000 sheep, wor $175,000.

Hon. J. B. Grinnell, of Iowa, informs the writer that he has fr $100 worth by dogs in a single night, and as this paragraph is p lowing item appears in an Iowa paper:

"We will refer to the case of John Scott, of Story county, who, a few weel 116 head of sheep killed by a gang of six or eight dogs in one night. We gentleman who saw the sheep the morning after they were killed, that the per head, a loss of $928. Since this loss Mr. Scott has met with another, though

A dog in New Jersey—a mad dog—bit and caused the death of $ of cattle, exclusive of sheep.

An editor of an agricultural paper, limping from dog bites in e after losing twenty-seven sheep of his first flock, shot a dog found the carcases of twelve lambs, and was fined therefor the price of six

Instances innumerable are offering themselves for quotation. T needed. If more than 200,000 sheep have been killed in Ohio in more than 2,000,000 have been destroyed in the country, depriving facturing industry of 6,000,000 pounds of wool by actual loss, an quantities by discouraging production. Thus are farmers discour facturers thrown into foreign markets, the country drained of gol dogs multiplied, and the national industry crippled.

But there springs up a necessity for more wool, and immediate liminary necessity for fewer dogs calls loudly for dog laws. But the w impatient of the "law's delay" in coming, seizes his trusty gun watches the advent of the sneaking cur across the borders of his o and executes justice speedily, diminishes the evil, and increases th number of sheep. So it has proved. Dogs are yet numerous, but vival of sheep husbandry the decline of dogs inevitably commence good work go on. All hail to the municipal dog-killer!

No fact in our agriculture is clearer, or more readily acknowledg serious effect of dog depredations upon the flocks of the country. most driven sheep from the east; it has diminished their numbers in regions, and the same cry is echoed from the prairies. Even the sheep upon those distant plains, under the care of shepherds, is aff and the word comes thence, "Dogs are the greatest drawback to th system."

WHY THEY SHOULD BE TAXED.

In these days of taxes it may seem absurd to attempt to tell why. I unnecessary. Horses are taxed, cattle, sheep; carriages are taxed, a pianos, plate, watches, &c.; bank checks, mortgages, foreign p receipts, and policies of life insurance—every imaginable species and almost every occupation or privilege of trade. Yet the owner erty in domesticated animals, imitating the habit of his proteges, abs over a tax upon his dog, wags a vituperative tongue at the makers tors of the law, and growls on the compulsion of its payment.

Dogs are property, and therefore taxable. The doubt of this fact, dog owners entertain, is only proof of the general uselessness of If a dog proves to be of the least utility, his owner finds no difficu his maltreatment or canicide, in getting damages for his property i

A bear or a wolf may be kept, and also becomes property, and showman who keeps them is taxed; and if allowed to trespass up or property of others, the proprietor is liable for damages.

While the dog is property, the utility of such property is cessive distribution [illegible] scope [illegible] adapted

it becomes a nuisance, a constant trespass upon the rights of citizens to be nated, and if the necessity of the case demands it, exterminated.

The dog may, then, either be taxed as simple property, or his keeping be li- ed as a matter to be regulated and restrained by law. Nor does a State onstitution, like that of Ohio, which requires the levying of taxes according to alue of property, prevent such licensing and restraint upon an animal which is lf domestic and half predatory.

The silly objections to the principle of taxing dogs shows the poverty of arguments against it. One man assumes it to be taxing one person to pay the losses of another, for which he is in nowise responsible. But a man who owns a dog, which may go unrestrained upon the premises of others, *is* responsible for damages he may occasion; and when, from the multiplied numbers of the race, and its habit of nocturnal wandering, it becomes an unmitigated nuisance, almost impossible of detection in its depredations, the community has a natural and legal right to impose whatever restrictions may, in the judgment of the law-makers, be necessary to abate the nuisance, although such restraints may reach good and bad alike, and affect the poodle that cannot harm a kitten, as well as the wolf-hound that lurks in the path of the traveller. But one person is not taxed specifically to pay the losses of another. The man who owns a dog should be taxed just as the owner of a sheep or lamb is taxed. Again, the dog may be taxed as a police regulation and restraint upon production. And then it is not only poetical, but exact, equal justice, that the money that comes from taxes of dogs should be used in part to pay the damage occasioned by dogs.

It is common for whiners over the dog tax to ask why the community should not be taxed to pay for the ravages of the weevil, the fly, the aphis, mice, &c. These absurd suggestions are acknowledgments of the rightful outlawry of dogs. If these pests should be taken up by man, petted, and propagated to prey upon the community, not only would the propagators, individually and as a class, be liable for damages, but they would deserve and possibly be assigned a situation in the penitentiary. It is common to hear laudations of the local laws which require cattle and other farm stock to be restricted to the premises of their owners, and, from the same lips, condemnation of the law which requires the same thing of an active animal of carnivorous habits and bloodthirsty temperament, which does its mischief in secrecy and in darkness, removes the marks of blood with cunning care, and reaches home by a circuitous route to greet the family at dawn of day with a look of innocency and a wag of the tail, unconscious even of the existence of wrong-doing.

The sportsman goes into the country for a month's enjoyment. He sallies forth with his dog and gun, and everything that ministers to his amusement or his comfort is made to contribute to the wants of the government through the revenue tax. He puffs a cigar for the public good, tips a flask of whiskey to strengthen the government, and burns gunpowder in aid of the rebellion's suppression; then he takes a sail in a taxed yacht propelled by taxed sails, fishes with a taxed line, solaces himself in the shade in a taxed tent upon the shore, and eats a chowder in which the very salt is taxed; and when, on a summer evening, he seeks amusement in a country circus or menagerie, the trick-mules and learned monkeys are taught to withdraw from the general circulation a substantial tribute to the nation. And yet the dog, the constant companion in all this round of pleasurable and taxable enjoyment, is exempt. No tax has more of the elements of justice and wise expediency than the dog tax.

WHY THEY ARE NOT TAXED.

The right of taxation is thus placed beyond a reasonable question. Why are they not in all States fully and effectively taxed? The reason is humil-

iating to American statesmanship. Man is nominally a vertebrate l
though American politicians have been claimed as exceptional spe
assumption in some degree unwarranted and unjust, except in t
legislation in restraint of dogs. In this regard the spinal colum
makers are affected to a lamentable degree with weakness or paraly

The man who has a dog has also a vote, and it is singular how a
tion of such a possession with such a franchise affects the law-maker,
delegate, assemblyman, national representative, or even invested with th
nity of an American senator. With what delicacy he approaches a
How he shrinks from doing a simple act of national protection when it a
an interest which ignores reason and justice, and acts from prejudice an
pulse. He acknowledges the right and inherent propriety of taxation,
shrinks from it neither wisely nor bravely. He invents excuses, but
them feebly, and finally acknowledges their impotency. "It wouldn't be a
ular measure." Such admission is honest as it is cowardly. "It is a
with which personal feelings and home affections have to do." So it
but the cold hand of the revenue law is laid upon the snugly ensconced
watch, however deftly hidden, and a tax extracted; and the soft tone o
piano is burdened with the wail of a tax. No! such excuses avail not!
they are worthless and unworthy of their source.

One who has done and suffered in this cause in a State that made ind
haste to repeal a wise and efficient dog law writes:

"Has any man political aspirations? Before the people will support him he must d
a dead and damned dog law unconstitutional, and must, at the sacrifice of his manhood,
and integrity, swear that he will never favor the smallest interference with the multipli
of hordes of dogs. A candidate must, in answer to the inquiry, 'What do you think
dog law?' instead of disposing of it with a wave of the hand and the declaration tha
dead and buried, enter into a lengthy disquisition upon its constitutionality, and over its
tendency to utterly subvert the rights of the American citizen. Nay, more; he must heartily
abuse every man who had aught to do, directly or indirectly, with its passage."

But our legislators are becoming, it is hoped and believed, not only more practical and patriotic, but more independent and free from time-serving. They are already manifesting not only a willingness, but a determination to do their duty in this matter, and the people do cheerfully and will heartily sustain them.

The following letter, written by Governor Randall, of Wisconsin, shows a politician with a sound head, a kind heart, and a stout backbone:

"EXECUTIVE OFFICE, *Madison*, *July* 6, 1860.

"DEAR SIR: Your letter in regard to the 'dog law' is received. The bill was properly signed, and is the law of this State, and that law will not be repealed with my approbation while I remain in office. No good citizen will object to it or refuse to obey it. A man who is able to own a dog, which costs as much as to keep a cow, is able to get a collar for him. No good citizen will refuse to make the sacrifice of obedience to that law when he must know that if it is enforced it will save the farmers and stock-growers of this State from $40,000 to $60,000 every year, and increase the number of wool-growers very largely. Every human life lost by the bite of a dog is worth more than all the dogs in the country. A man who is not willing to sacrifice one dollar for his privilege, where so great a benefit may accrue to the State by compliance with the provisions of the act, ought to be kicked out of it.

"Very truly, yours,

"ALEX. W. RANDALL."

DIGEST OF OUR DOG LAWS.

In the general desire for enactment of judicious dog laws recently revi
throughout the land, and consequent action of legislative bodies, the latest cha
in such laws may not have been received, and therefore the following synops
the laws of several of the States may not be without imperfections. It exhi
great variety, some nearly impracticable and of little efficiency, and ot
later origin, very efficient and indicative of wholesome progress.

MAINE.

law taxing persons owning or harboring dogs one dollar for each dog was
l in 1862 with a saving clause as follows: "*Provided*, That towns or
shall so vote."

sy its provisions dogs inflicting damage subject their owners to fines of
le the amount of the damage done, to be recovered by an action of trespass.
ny person may lawfully kill a dog that assaults himself or other per-
while walking or riding peaceably, or is found worrying, wounding, or kill-
any domestic animal.

y person finding a dog strolling out of the enclosure of his owner may,
nin forty-eight hours, make oath before a magistrate that he suspects such
to be dangerous or mischievous, and notify the owner by giving him a copy
ie oath; and if the dog shall be found again at large, he may be lawfully
ed; and if he shall thereafter wound a person or kill a domestic animal, the
ner shall be liable to treble damages and costs.

The report of the Maine Board of Agriculture attests the pertinacity with
ich the farmers of that State have sought legislative protection to sheep
bandry, and says:

"Those canine causes still continue, like 'war risks,' to eat up the profits. The essence
gislative interference has been too much like British neutrality. * * * The as-
ption has been unimpeachably established beyond denial, by the farmers of the State, that
losses from wild animals, disease, and accident are not equivalent to the losses from the
redations of dogs. Facts and figures, multiplied to an almost unlimited extent, testify to
truth of the assertion. Supplications, remonstrances, and petitions have failed to induce
legislature to abate the grievance or remove the transgressors."

The law is mainly inoperative, as might be expected if it was not so intended.
a man is assaulted by a human assailant he may kill such assailant with im-
nity under the common law; but if he shall be attacked by a dog, he may
; kill the brute under this State law, but is allowed, after binding up his
unds and making oath that they exist, to cool his blood for forty-eight hours
waiting for a legal opportunity, to lie in wait for the ruffianly animal, after
owner has been advised officially of the propriety of tying him up. In-
ad of protection to sheep, this looks more like protection to sheep-killing
gs. And so worthless a law as this may exist in one township and not in
adjoining, which may be full of sheep-killing curs.

NEW HAMPSHIRE.

In 1862 the legislature levied a tax of one dollar on male and two dollars on
le dogs. Prior to this the common law was the only protection enjoyed by
ners of flocks.

In 1863 a law was enacted forfeiting double the amount of damage done by
, recoverable from the owner by an action of debt; or a complaint may be
ue to the selectmen of towns, who are required, upon proof made within
rty days, to draw an order upon the treasury, which is registered and made
yable, in whole or in part, from the fund accruing from the dog tax, on the
ond Tuesday of March annually.

VERMONT

The following is the law of 1862:

CTION 1. The listers in the several towns of this State shall in each year set all dogs in
r respective towns in the grand lists to the owner or keeper of the same at the sum of
dollar each; and no person shall be entitled to have the amount so assessed deducted
lists in consequence of any debts owing.

. . Every owner or keeper of a dog shall, when called upon by the listers for their
notify them of the dogs by him owned or kept; and every owner or keeper of a dog
l neglect or refuse to notify the listers as aforesaid, shall forfeit and pay to the town

in which he resides the sum of two dollars, to be recovered in an action on the case name of the treasurer of such town, before any court competent to try the same, with costs.

SEC. 3. It is hereby made the duty of the owner or keeper of a dog, whether the lists or not, to cause a collar, with the name of the owner or keeper plainly thereon, to be worn on the neck of each dog by him owned or kept; and it shall be for any person to kill any dog running at large off the premises of the owner or keeper having on such collar; and the owner or keeper of such dog shall recover no damages such killing.

By another law, owners of dogs that have worried or wounded sheep are made liable for double damages and double costs; and they can also maintain action for damages against persons who have killed dogs assaulting or chasing the premises of their owners, or chasing or worrying sheep.

MASSACHUSETTS.

In Massachusetts, where sheep husbandry of a high order is one of the most important industries, the most stringent and effective laws have been passed. The following is a synopsis of the last law:

AN ACT concerning dogs and for the protection of sheep and other domestic animals.

Be it enacted, &c., as follows:

SECTION 1. Every owner or keeper of a dog shall annually, on or before the 1st day of April, cause it to be registered, numbered, described, and licensed for one year from the first day of the ensuing May, in the office of the clerk of the city or town wherein he resides, and shall cause it to wear around its neck a collar distinctly marked with its owner's name, and the registered number, and shall pay for such license two dollars for a male dog and five dollars for a female dog.

Sections second, third, and fourth provide for licensing and the payment of money into the treasuries:

SEC. 5. Whoever keeps a dog contrary to the provisions of this act shall forfeit fifteen dollars, to be recovered by complaint, and the money shall be paid to the treasurer of the county in which the dog is kept, &c.

SEC. 6. The assessors of the cities and towns shall annually take a list of all dogs owned or kept in their respective cities or towns on the first day of May, with the owners' or keepers' names, and return the same to the city or town clerk on or before the tenth day of July. Any owner or keeper of a dog who shall refuse to give just and true answers to the assessors relative to the ownership thereof shall be punished by a fine of not less than ten dollars.

SEC. 7. Mayors of cities and the chairman of the selectmen of towns shall annually, within ten days from the first day of July, issue a warrant to one or more police officers or constables, directing them to proceed forthwith either to kill or cause to be killed all dogs within their respective cities or towns not licensed and collared according to the provisions of this act; and any person may, and every police officer and constable shall, kill, or cause to be killed, all such dogs, whenever and wherever found. Such officers, other than those employed under regular pay, shall receive one dollar for each dog so destroyed from the treasurers of their respective counties, &c.

SEC. 8. The mayors of cities and the chairman of the selectmen of towns shall, after issuing their warrant to police officers or constables, as specified in the preceding section, forthwith certify the fact under oath to the district attorneys of their respective districts, whose duty it shall be to prosecute all such officers as fail to comply with this requirement.

SEC. 9. Whoever suffers loss by the worrying, maiming, or killing of his sheep, lambs or other domestic animals by dogs, may inform the mayor of the city, or the chairman of the selectmen of the town wherein the damage was done, who shall appoint two disinterested persons, who, with the mayor or chairman of the selectmen, shall proceed to the place where the damage was done, and determine whether the damage was inflicted by dogs, and if so, appraise said damage. The amount of said damage shall be certified by the said appraisers, and, except in the county of Suffolk, be transmitted to the county commissioners, who shall during the month of December examine all such bills, and, when any doubt exists, may summon the appraisers, and make such examination as they may think proper, and shall issue an order upon the treasurer of the county in which the damage was done for all or any part thereof, as justice and equity may require.

The treasurer shall annually, on the first day of January, pay all such orders in full, if the gross amount received by him under the provisions of this act, and not previously paid out, is sufficient therefor; otherwise, he shall divide such amount *pro rata* among such orders in full discharge thereof.

The board of appraisers shall receive from the county, or in the county of Suffolk from the city or town treasurer, out of the moneys received under the provisions of this act, the sum of one dollar each for every examination made by them as prescribed in this section.

SEC. 10. Any town, city, or county officer refusing or neglecting to perform the duties herein imposed upon him, shall be punished by a fine not exceeding one hundred dollars, to be paid, except in the county of Suffolk, into the county treasury.

SEC. 11. The treasurer of any county may, in an action of tort against the owner or keeper of any dog concerned in doing damage to sheep, lambs, or other domestic animals in said county, which damage has been ordered to be paid by the county commissioners, recover the full amount thereof to the use of said county. If the amount so recovered exceeds the amount so received by the owner of the sheep or other animals, under the provisions of section nine, the excess shall be paid by the county treasurer to such owner. All fines and penalties provided in this act may be recovered on complaint before any police court or trial justice in the county where the offence is committed. Moneys received by the treasurer of any county, city, or town, under the provisions of this act, and not expended in accordance with its provisions, may be applied to the payment of any county, city, or town expenses.

RHODE ISLAND.

In this State, by the law of 1860, a dog might be killed with impunity if found without a collar bearing his owner's initials, or worrying or wounding sheep or other stock out of the enclosure of his owner. Any person might make oath to any case of injury, or to the special ill-fame of any particular whelp, and if the allegation was sustained, the dog must be confined, or the life of the animal was forfeited.

A distinguished correspondent suggests that the private history of that law would be instructive and amusing. The substitution of the recent and more stringent law for the old one was suggested to the legislature by the Society for the Encouragement of Domestic Industry. The former law allowed the several town councils to make ordinances taxing dogs, and providing for injuries inflicted upon sheep. A general State law also provided for recovery of damages of the owner of dogs, and double damages and the killing of the dog for a second offence. The agricultural committee of the society, to whom the matter was referred, reported that these municipal regulations were discordant, and were not enforced. The substitute proposed they describe as less stringent than those of Massachusetts and Connecticut, and quite too tame, but still as severe as they dared to recommend. It was discussed in the legislature of 1860 for several days, and the present enactment was finally hatched from a new incubation of anxious politicians, fearing the retributions of voting dog owners.

An additional law has just been passed, which requires dogs to be collared, registered, numbered, described, and licensed, with the payment of $1 15 for each male and $5 15 for each female dog, before the last day of April, and one dollar additional for each dog after that date, and previous to the first of June. It provides for the appointment of suitable persons to make a list of the owners or keepers of dogs, to be returned to the clerk previous to the first of May, who is required to furnish to such persons a list of all dogs licensed for the current year, and to make another list of those not licensed, with the name of the owner or keeper, to be suitably posted or advertised. Any one keeping a dog contrary to these provisions is liable to a fine of ten dollars; and persons appointed to make the lists are required to make complaint and prosecute delinquents prior to the first of July. Such persons and constables and police officers are required to kill and bury all unlicensed dogs, and any person may lawfully do so, and for such service the sum of one dollar shall be paid. Removal of a collar is punishable by fine not exceeding fifty dollars. Damages to sheep are recoverable upon proof made within thirty days from the town or city treasury on the first day of June, or a *pro rata* proportion of them if the tax fund is insufficient for payment in full; and the city or town may then recover from the owner of the dog doing the mischief.

CONNECTICUT.

By the latest law for the protection of sheep—that of July, 1863—upon male dogs is one dollar each, females two dollars. The selec n authorized to collect of negligent collectors the taxes unpaid, as in the c f other arrearages due from collectors; and they are not empowered to such tax unless upon satisfactory proof that the dog is dead. The selec are also empowered to institute suit against the owners of dogs for the of damage for sheep maimed or killed; and if the owner resides in an town, the suit may be brought against that town.

The provisions of the former law, yet partially in force, require the registry of all dogs over three months old, and sanction the killing of all not registered, and persons neglecting or refusing to register are liable to a fine of three dollars each. Dogs of known bad character shall be killed, although registered; and it is lawful to kill any dog taken in the act of worrying sheep.

NEW YORK.

The laws of this State upon this subject, as amended by that of 1862, impose a tax of fifty cents for the first dog, $2 for each additional; $3 for the first female dog, and $5 for each additional. The assessors are required to annex to the assessment roll the names of persons liable, and supervisors must return them, when, if failure in paying the tax occurs, it becomes the duty of the collector, and the privilege of any other man, to kill the dog. The collector has a commission of ten per cent. on fines, and one dollar for each dog killed. The previous enactment provided that the owner of dogs killing sheep should be liable for injuries perpetrated; and in case the owner should not be found, the loss should be paid out of the fund arising from the dog tax.

NEW JERSEY.

By the laws of New Jersey dogs are taxed from fifty cents to one dollar each. Persons may lawfully kill a dog found worrying or wounding sheep; damages sustained by such depredations are collectable from the township committee, if the fund arising from such tax is sufficient. If the owner of a dog committing depredations shall neglect for twenty-four hours after notification to kill the animal, he shall forfeit ten dollars and costs to any person suing, and triple damages to the owner of the stock injured or killed. A provision is made for the assessment of damages sustained, to be certified by two disinterested freeholders, the amount not to exceed five dollars for each sheep or lamb killed. Some counties have had special enactments allowing full damages to be paid.

William M. Force, secretary of the State Agricultural Society, says that a recent act has been secured "by the provisions of which actual damages sustained by any person were estimated by appraisement by two disinterested freeholders, the oath of the owner being also required as to real cost and value, the township where the injury was committed paying the owner, and the amount annually ascertained being laid upon the owners of dogs as a dog tax."

PENNSYLVANIA.

No effective law is in existence in this State for the protection of sheep. The owner of a dog, knowing that he has worried or killed sheep, and failing to kill him after such knowledge, is liable for all damages done by him *thereafter*. A dog may destroy a flock of sheep, without danger to himself or loss to his master, until he has offended a second time. If he kills a second flock, and his owner conveniently ignores the fact of the former offence, he may await, with the wool yet in his teeth, for an opportunity to return once more to mutton.

DELAWARE.

Legislation relative to protection of sheep was initiated early in this State. A law of 1811 made the owners of dogs liable to the value of all sheep killed by them; that of 1820 forfeited the lives of dogs at large without collars on their necks. By the law of 1811 the tax was from 25 to 50 cents for the support of the poor; by that of 1817 it was from 50 cents to $3 for a fund to pay for sheep killed by dogs; by that of 1839 from 50 cents to $1 for county purposes; by that of 1843 one dog was exempt, others $1 each for county purposes; by that of 1853 from $1 to $2 for a fund to pay for sheep killed by dogs. These are repealed, their principal provisions being incorporated in the following laws:

"The owner or possessor of a dog which shall kill, wound, or worry a sheep or lamb shall be liable to pay the owner of such sheep or lamb the full value thereof, and it shall be lawful for any person to kill such dog. It shall be lawful for any person to kill any dog running at large in Newcastle county, beyond the owner's premises, without a collar upon his neck with the owner's name upon it."

The law of 1862 requires an assessment list of persons owning dogs to be returned to the levy court. The tax is placed at 50 cents for each male and $1 for each additional dog, and $2 for each female dog, which shall procure the fund from which damages shall be paid, not to exceed $3 for each lamb and $5 for each sheep injured or killed, the remainder, if any, to go into the school fund. A dog not on the assessment list, which may be wandering or caught worrying sheep, may be killed. Persons paying taxes upon dogs are deemed to have property therein, and may recover damages for theft of or injury to such dogs.

MARYLAND.

In this State the owner of a dog proved guilty of killing or injuring sheep is required, upon complaint and exhibition of proof, to kill such dog, in default of which the owner of the sheep may kill him off the premises of his owner, or require a constable to do so, wherever found. If the dog shall be killed immediately by his owner, the owner of the sheep injured can have no cause of action; if not thus killed, his owner is liable for double damages, with costs, recoverable by an action of debt.

OHIO.

Several laws have been enacted to restrain dogs, none of which have been very stringent or effective, or generally executed. The latest was passed by the general assembly in 1863, declaring it unlawful for any dog to run at large off the premises of the owner in the night season, between the hours of seven o'clock in the evening and six o'clock in the morning, unless accompanied by the person owning or harboring the animal; and the owner or keeper is required to keep the dog upon his premises between those hours. It is of so negative and incomplete a character as to be practically worthless. The only real protection of an Ohio flock is a well-loaded gun in the hands of its owner.

INDIANA.

A license is required, at fifty cents for the first male dog, one dollar for each additional dog, and one dollar in every case for a female dog. All unlicensed dogs are declared nuisances that may lawfully be killed. Accruing funds are set apart for the payment of damages suffered from injuries to sheep in the several townships. The sufferer has his option of the following remedies: Within ten days after having knowledge of such depredations he may substantiate it to the satisfaction of the township trustee, and draw the amount at the end of the current year, or a *pro rata* proportion if the fund is deficient; or

he may recover by suit full damages from the owner of the dog. A fine of from five to fifty dollars and liability to damages, recoverable by the owner, are the penalties for killing licensed dogs that maintain a fair canine character.

The Secretary of the Board of Agriculture reports that the law is so defective that it virtually amounts to nothing.

MICHIGAN.

A law approved March 29, 1850, authorizes the destruction of dogs attacking any kind of domestic animals except on the premises of the owner of the dog, and such owner is liable for double the amount of damages done by the dog. When notified of such damage, neglect of the owner to kill the dog is punishable by a fine of $3, and $1 50 additional for every forty-eight hours thereafter until such dog shall be killed. Supervisors, upon complaint of a citizen, verified by his oath, are required to prosecute and recover the fines imposed by this act.

An act was passed March 20, 1863, requiring township assessors to ascertain the number of dogs liable to be taxed and the names of their owners; and if such owners refuse for ten days after demand to pay the taxes assessed, it becomes lawful to kill the dogs so taxed.

WISCONSIN.

By the law of 1860 dogs are required to be numbered, collared, registered, and licensed on payment of one dollar for males and three dollars for females; and police officers, constables, and marshals are required to kill and bury all unregistered dogs, and to receive twenty-five cents for such service. A person may be fined fifty dollars for removing a collar. Persons suffering loss from dogs are paid full damages at the first of April if the tax fund is sufficient; if not, *pro rata;* and the owner of the dog is liable to the town for the full amount The fine for keeping unregistered dogs is five dollars. Officers neglecting or refusing to obey the law are fined $20 for every twenty-four hours of such neglect. Towns may increase the license not more than one dollar, and the penalty not more than ten.

MINNESOTA.

The following is an epitome of the law of March, 1863, which repeals previous enactments on the subject:

Every owner or keeper of a dog shall cause such dog to be registered, numbered, described, and licensed, paying one dollar for each male and two dollars for each female. The township or city clerk shall conspicuously post a list of all licensed dogs, and furnish one to constables and chief of police. Failure to license shall make one liable to a penalty of ten dollars. Stealing or poisoning a dog is punishable by fine not exceeding fifty dollars, and killing subjects to liability for damages double the value of the dog. Constables and police officers shall, and any person may, kill any unlicensed dog; any one may also kill a dog assaulting him, or worrying sheep out of the enclosure of his owner. Within thirty days after suffering injury or loss of sheep by dogs, proof of damage may be presented to the county auditor, who may draw an order upon the treasurer, payable from the fund accruing from taxes of dogs, when the city or town may sue and recover full damages from the owner of the dog. It is made the duty of the mayor and aldermen of cities, and the supervisors of towns, to require the destruction of unlicensed dogs, and officers refusing or neglecting to perform these duties are liable to a fine of twenty-five dollars for the benefit of schools. All of these penalties may be recovered, on complaint by any householder, before any justice of the peace of the county. Money remaining after the yearly payments from the tax fund is turned over to the school fund.

IOWA.

A law was passed in 1862 by the Iowa legislature for the protection of sheep against the ravages of dogs. At the following session, called with reference to legislation in the interest of the soldiers, the law was repealed in utter disre-

rd of the interests of volunteers dependent on their flocks for the clothing of eir families.

MISSOURI.

Extensive injuries have been sustained by dogs in Missouri, yet the legisla-re has resisted the effort to procure legal protection. Instances, not unfre-nt, are reported of large flocks driven into the rivers by packs of hounds . drowned. A correspondent of the department is constrained to believe at some of his neighbors think more of their dogs than they do of their ildren.

TENNESSEE.

The secretary of state for the State of Tennessee writes that no laws for ie protection of sheep exist in that State, notwithstanding the persistent ef-rts of farmers for many years to secure such an enactment. Damages have en very serious here, affecting very materially the business of wool-growing.

CONCLUDING SUGGESTIONS.

It has been shown to the satisfaction of the reasonable reader that a large ortion of the dogs in the country are utterly useless; that the cost of their eeping, and the damages directly occasioned to farm stock, amount to an an-nal tax of at least thirty-three millions of dollars; that they discourage sheep usbandry, and consequently woollen manufacturing, to the extent of many illions more, which would otherwise be added to our productive industry; t they are property, and therefore taxable, and in their excessive multipli-ation a nuisance to be regulated or abated; and that, unfortunately, a weak esitancy about inaugurating taxation, not indicative of the true dignity and roper independence of statesmen, has too often existed among legislators.

The laws of the several States indicate a transition period between pioneer fe, with its inevitable dog companionship, and a state of permanent settlement nd superior civilization. The silly prejudice that allows dogs to trespass upon neighbor's grounds and destroy his sheep, while enacting laws to restrain ep from wandering from their owner's pasture, is rapidly giving way to a ommon sense that would make restraint equal and just.

In most of the States are certain provisions of a just law upon the subject, ut a lack of completeness, or want of penalty attached to neglect in enforce-ient, render them partly inoperative, or wholly inefficient. In Pennsylvania here is, practically, only a threat held over the heads of the dogs, for which hey seem to care very little; in Maine, each separate township has the option o ratify or nullify the general law—a non-committalism that is far worse than o law; in Ohio, dogs are instructed that it is unlawful for them to run at large t night, but their owners are held to no proper responsibility for their effective estraint; and in most other States some radical defect exists. Massachusetts as the best law. It taxes dogs from two to five dollars each; owners are ade responsible, under heavy penalty, for their registry and taxation; assessors ust make accurate lists, and evasions of the listing are heavily fined; refusal or eglect of officers to execute the law incurs a penalty of one hundred dollars; and ntaxed dogs are killed without mercy, and district attorneys are requried to osecute officers who neglect to destroy them.

Such a law, or one more guarded and efficient still, should be on the statute ook of every State.

GEOGRAPHY OF PLANTS.

OUTLINE SKETCH OF THE GEOGRAPHY OF PLANTS AND OF THE
POSED FOR DETERMINING THE AMOUNT OF HEAT REQUIRED BY THE
AND THE WHEAT PLANT; WITH REMARKS ON THE PRODUCTION OF
VARIETIES OF WHEAT, AND ON THE ACCLIMATION OF PLANTS, AND
TIONS ON THE NECESSITY OF A MORE ENLIGHTENED AGRICULTURE.

BY JAMES S. LIPPINCOTT, HADDONFIELD, NEW JERSEY.

THE most superficial observer has doubtless sometimes noticed a
the arrangement of natural objects, and believes that they have not
tributed by chance, or left without the superintendence of a directi
He perceives, if his view becomes more extended, that they have
scattered at random over the surface of the globe. He who is bet
has learned that living beings (animals and plants) are regulated in
tribution by especial laws, and that their arrangement gives to each
peculiar aspect.

The physical conditions which seem to regulate this distribution of
beings are diversified, and are mostly included under the idea of
Among the agencies which are understood to influence the life, health, d
ment, and extension of the range of animals and plants, the more import
the distribution of heat throughout the year, its periodic increase and
tion, the conditions of humidity or dryness of the air and of the soil, the
of light, the electric conditions, and in some instances the pressure of th
sphere, and the varying degrees of actinic power or force of the chemic
of the sun.

There are other very important considerations affecting the distri
plants, which are not properly included under our idea of climate.
these may be enumerated the composition and chemical character of
which are influenced by the rock whence it was derived; the mechani
ditions of the soil, whether friable or coherent, readily decomposed, or
decomposition in a state of fine comminution, or in coarse grains or
permeable readily by heat, rain, or moisture, or otherwise; and, finally
amount of vegetable matter therein, the color of the soil, and its inclina
exposure to the rays of the sun. The art of the agriculturist enables
modify all these latter-named circumstances, and to adapt the soil to his
needs; but the vicissitudes of the climate he cannot control—over the
he has not been made master.

The most important climatic influence is temperature, which, indeed,
association may be termed the dominant power. It is beneath the ard
of a tropical sun that the noblest forms of vegetation are developed, whil
circumpolar zones neither trees nor shrubs can exist, and extensive
are entirely destitute of plants, or in favored spots alone are found a few
and diminutive herbs, which the short summer of these regions calls fo
the partially thawed surface of the deeply frozen ground. Between th
products of the torrid zone and the almost barren desolation of
regions there exists every variety of vegetable form, growing g
diversified and generally more dwarfish as we approach the limits o

rth and south, and exhibiting a correspondence between the modifica-
or t perature observed successively in our progress from the equator to
oles, and the geographical distribution of vegetable and, generally also, of
al life on the earth.

ie geographical distribution of plants is a subject of vast extent and im-
nce. The nature of the vegetation covering the earth varies, as we have
rked, according to the climate and locality; and plants are fitted for dif-
inds of soils, as well as for different amounts of temperature, light, and
e. From the poles to the equator this constant variation in the nature
flora is a shifting scene, passing from the lichens and mosses (the lowest
ble forms in the Arctic and Antarctic regions) to the noble palms,
and orchids of the tropics by a series of regulated changes through
multiform aspects of the vegetable kingdom. The same progress and
ia fitness is observed in the vegetation of lofty mountains under the
, when descending from the summit to the base. From the scanty
ion of Greenland, where the only woody plants are the Arctic willows,
scarcely a finger length in height, we may trace the expansion of vegeta-
as we move southward over the lichens and mosses to the saxifrages and
us plants, or those which resemble the cabbage and the turnip in their
flowering; then to grassy pastures, and by coniferous or fir-like trees,
taceous or birch and alder-like trees, to the northern borders of the
States. Extending our glance further southward, we shall perceive
enter the region of oaks, hickory, and ash, of tulip-poplar, buttonwood,
red and white cedars, sugar and other maples, sassafras, sumac, laurel,
many other trees and shrubs characteristic of the temperate regions of
h America. In the districts further south we find an increase both of
es and of genera, and more tropical forms show themselves, such as mag-
, Osage orange, honey locust, cypress, holly bay, wax myrtle, the cotton
rice, the live oak, and enter the borders of the regions of the palmetto
orange; thence to those of the sugar-cane and pineapple, the coffee
and cocoa-nut, and the luxuriant vegetation of the equator and torrid
"In this progress," as Humboldt, the father of geographical botany,
rks, "we find organic life and vigor gradually augmenting with the in-
e of temperature. The number of species continues to increase as we
ach the equator, and each zone presents its own peculiar features; the
es their variety and grandeur of vegetable forms; the north its meadows
e pastures, its evergreen firs and pines, and the periodical awakening
in the spring time of the year."

r causes intimately connected with the aspects of our globe have an
e in modifying the conditions of climate, and thus affecting the dis-
of animals and plants on its surface. The geographical forms of
, the relief or elevation and depression of the terrestrial surface, the
of size, extent, and position, each exert a very marked effect upon the
peculiarities of a district. The bearing or direction of the shores of a
, the elevation of a mountain in one place rather than in another, the
n of a continent into islands or peninsulas, and other minor differ-
ve very important bearings upon the climate of a district. The de-
of a few hundred feet over some wide areas would reduce some regions
el of the sea, or sink them beneath its waves, or so modify the climate
er portions left above the waters as to render them no longer tenable
that once enjoyed a congenial clime. This is shown by the obser-
so low islands scattered in clusters are covered with a vegetation
ent from that of extensive plains, though lying in the same i-
e in the bearing of the shores would modify the currents of
would react upon vegetation. Mountain chains have oftenti

an influenee upon the prevailing winds, and their height, or the plate which they arise, modify the climate, and render it temperate or arc the fervent heats of the torrid zone. A mountain chain extending fr west may form a barrier between the colder regions on the north warmer on the south, and thus protect the northern plains from th winds of more temperate regions, and increase the heat on the sou This is exemplified by the Alps of Switzerland, which reduce the t of Germany below the mean that would otherwise prevail but for th influence. Under some of the high towers of this mountain barrier ag assaults of winter, the palm, the pomegranate, the orange and the olive the open air, while a few miles to the eastward, in valleys, open to through which the hurricane blasts of the Borra rush with terrific r severity of cold, often sweeping vessels from anchorage, these mo plants cannot exist.

A few thousand feet in elevation, which is insignificant compared mass of the earth, changes entirely the aspect and the character of a For evidence of this assertion we may compare the burning region Cruz—its tropical productions and its fatal fevers—with the lofty] Mexico, their temperate growths and perennial spring, or the immen of the Amazon, where vegetation puts forth all its splendors, and whe life is abundantly prolific, with the desolate paramos or Alpine regio summits of the Andes, "rude, ungenial and misty." Or imagine th plains of the United States, east of the Rocky mountains, to be slightly towards the north, and the Mississippi river to empty into the Fro Arctic ocean, or into Hudson's bay, and the new relations of war moisture incident upon this simple change of direction of the curren river would effect the most important modifications in the condition vegetable and animal world, would exert a still greater influence r welfare of the inhabitants, and, through them, upon the destinies of so to be, and, perhaps, upon the entire human race.

The climate that would result from latitude alone is greatly modifie presence or absence of extended sheets of water; and the distributio through the year, for any place whatever, depends essentially on its p to, or distance from, the ocean or large lakes, and the relative frequenc winds that blow over them. The equalizing influence of large bodies the temperature of which is less liable to sudden changes than the atm air, is quite apparent. While in Ireland and the southwestern part of the myrtle grows in the open air, as in Portugal, fearless of the cold o the summer sun of these so genial isles does not succeed in perfectly the plums and pears which grow and ripen well in the same latitude on tinent. On the coast of Cornwall shrubs as delicate as the orange are green throughout the year in the gardens, though in a la which, in the interior of the continent of Europe, trees the most ha alone brave the winter cold. The mild climate of England cannot r grape almost under the same parallel where are grown the wines of th nor will our Indian corn ever mature or attain there, even the size it w on our most northern border or in Canada.

In our own country the influence of the ocean is very favorable, and apparent in the northern sections, where it attempers the heats of sur the land by the sea-breezes which prevail during part of the day al coast. Nor is this genial influence of water upon the temperature neighboring land limited to very extensive bodies. The inland lakes o America certainly ameliorate the otherwise severe climate of the di which they are located, and even the minor lakes of western New Yor the extremes of cold, and, in connexion with their larger congeners, pro

ipient vegetation of spring, and prolong the growing season by preventing
recurrence of early autumn frosts.

Under the influence of the physical agencies of heat, moisture, &c., vegeta-
exhibits a regular progression, whether we ascend from the equator towards
poles, or from the base of a high mountain, under the equator, towards its
mit to the regions of perpetual snow. In both these directions there is a
xing general agreement in the order of the succession of the phenomena, so
t the natural productions of any given latitude may be properly compared
th those prevailing at any given height above the level of the sea. The
evation at which any variety of plant will grow spontaneously will, of course,
vary with the latitude of the mountain on which it exists. There may then
be said to exist a corresponding similarity of climate and vegetation between
the successive degrees of latitude and the successive heights above the sea.

There is a class of plants which a slight advance beyond the freezing point
calls forth from their winter sleep, which have a peculiar stamp, and constitute
a peculiar flora, termed Alpine. We find this Alpine flora in regions where
snow covers the earth, where the lakes are frozen most of the year, as in
northern Lapland, northern Siberia, Arctic North America, on the Alps, the
Pyrenees, the Carpathians, the Caucasus, in the mountains of Norway, on
Scotch and Icelandic summits, in the Himalayas, the Sierra Nevada, and on
our own Mount Washington. On the latter, Alpine plants identical with those
of Lapland in latitude 67° north, where they grow at a height of three thousand
feet and less above the level of the sea, are found at a height of not less than
six thousand feet in latitude 44° north, while below this limit, in the wooded
valleys of New Hampshire, there is not one species which occurs also about
North Cape. The Alpine flora appears almost ubiquitous wherever a tempera-
ture sufficiently reduced, and yet adequate to sustain life, is found. Scandinavian
genera and even species reappear everywhere from Lapland and Iceland to the
tops of the Alps of Van Dieman's Land, in rapidly diminishing numbers, it is
true, but in vigorous development throughout. They abound on the Alps and
Pyrenees, pass on to the Caucasus and Himalaya, thence extend to those of
the peninsula of India, to Ceylon and the Malayan Archipelago, (Java and
Borneo,) and reappear on the Alps of the New South Wales, Victoria, and
Tasmania, and beyond these again on those of New Zealand and the Antarctic
nds, many of the species remaining unchanged throughout. It matters not
at may be the vegetation of the bases and flanks of these mountains, the
rthern species may be associated with Alpine forms of Germanic, Siberian,
ital, Chinese, American, Malayan or Australian, and Antarctic types, which
all more or less local assemblages; the Scandinavian, from Sweden, Lapland,
Norway, asserts its prerogative of ubiquity from Iceland, beyond its
ipodes, to its Antarctic congener of high southern latitudes.*

The correspondence between the ascending vegetation on mountain sides and
distribution of trees, especially over the whole extent of the temperate
s, is so close that it may be considered a universal law. On lofty
tains climates seem arranged, as it were, in strata, one above another,
a regularity that has strongly impressed the attentive observer. He has
uced that the trees resembling the chestnut and the walnut, or most of those
flower in aments or catkins, occur in the lower latitudes under the influence
a genial clime, but disappear entirely before he reaches a latitude or an
vation where agriculture ceases. Further north he finds a variety of
pl , willows, oaks, maples, and other deciduous trees interspersed with
which begin to form continuous forests until they become an almost
pine and birch forest, covering in unbroken continuity the more northern
ces as far as trees extend. So likewise, in ascending higher and higher on

*J. D. Hooker, Flora of Tasmania.—Silliman's Journal of Science, XXIX, pp. 323, 3

the slopes of mountains, he observes the same order of succession of po
oaks, maples, &c., followed by forests of pines and birch to the
wooded growth. Beyond this, both towards the polar regions, and hi
the mountain side, the Alpine vegetation, before referred to, succe
detailed comparison of northern and Alpine vegetation would show t
agree in almost every respect, and that in general corresponding s
under similar circumstances in different parts of the Old and New Worla, r
ing each other in the same succession from south to north, as well as fr
plains to the mountain summits.

Illustrations drawn from observations made in our own country are al
more interesting, and, perhaps, more convincing than those brought fr
regions. Many of our readers may have had the opportunity of witn
the truth of the following detailed description of changes in the
of vegetation by increase of height and consequent increase of cola,
served on the sides of Mount Washington and in the district at its

The traveller who has visited the White Mountains of New Hampshire
the south, will observe, on ascending from the lower districts towards
waters of the Connecticut river, that the forest vegetation begins to
character differing from that lower down the main valley or that n
ocean. At Windsor, three hundred feet above the level of the sea, the
has already disappeared. Between Windsor and Littleton the hemlock
the white pine, arborvitæ, larch, the buttonwood, the beech, the wl
black, the yellow, and canoe birches, the white, the red, and swamp
oaks, the elm, white ash, aspen poplar, the linden or basswood, sugai
and a few other species of maples and less important trees may be se
Littleton the buttonwood and hog walnut or pig nut disappear, the oaks
and smaller, and the mountain maple, which is not found below here,
appearance. From Littleton, eight hundred and seventeen feet above
level, to Fabyan's, which is fifteen hundred and eighty-three feet above
sea, he will notice the white spruce, balsam spruce, hemlock spruce, wl
larch, linden, white ash, sugar maple, mountain maple, elm, the birches
named, and some others. The cup-bearing trees, or the oaks, the ch
the birch have disappeared, and the pitch pine is no longer observed.
vegetation continues from Fabyan's to a level of two thousand and eighty
where the pines are the prevailing features of the forest. From this le
slope becomes much steeper, and the variety of trees is much reduced.
this, to the height of four thousand two hundred and fifty feet, the veg
consists almost entirely of white and balsam spruce,* the lofty or yellow
and the canoe birch, which become gradually more and more stunted
the height above named, the species which form tall and splendid trees
two thousand feet lower, appear here as mere shrubs or low bushes with cro
branches so interwoven as almost entirely to hedge up the way, excep
places where a bridle-path has been cut through. Above this level, wi
almost as elevated as the summit of Mount Clinton, and higher than E
Head, near Eagle pond, of the Franconia mountains, the mountain is
of forest trees. Many minor plants, however, appear which remind t
informed and philosophic botanist of the flora of Greenland, and many or
have been found growing on the sub-arctic northern shores of Lake Si

* Most of the high mountain tops in western North Carolina and East Tennessee are covered with Abies nigra and Abies Fraseri, the former the black spruce, the latter the balsam fir. The black spruce grows at a lower elevation than the balsam, but neither of them are often met with beneath a height of 4,000 feet. Eight degrees of lower latitude causes them to ascend to a greater height.—S. B. Buckley, Silliman's Journal, XXVII, pp. 386-394.

The summit of Mount Washington,* six thousand two hundred and eighty-eight feet high, produces several plants which have no representatives south of Labrador. These, it may be interesting to some readers to be informed, are Andromeda hypnoides, Saxifraga rivularis, Rhododendron lapponicum, and Diapensia lapponica.

We are all as well aware that the mean annual temperature in this country decreases as we proceed towards the north, as we are that we shall encounter increase of cold on ascending a high mountain. All are not equally well acquainted with the rate of variation either on the plain or on the mountain slope. In central Europe the change in mean annual temperature takes place at about the rate of one degree of Fahrenheit for each degree of latitude, or for about every seventy miles; while in the interior of the United States, in the Mississippi valley, the rate of decrease is about one degree of Fahrenheit for every forty miles; or, in other words, as we travel north or south we reach successively localities the mean annual temperatures of which are one degree of Fahrenheit's thermometer lower or higher as we pass over seventy miles in central Europe, or forty miles in the valley of the Mississippi. In the Alps of Switzerland, in ascending or descending, the same change of one degree in mean annual temperature is experienced for about every three hundred feet of vertical height, so that we can pass, within the narrow limits of between six or seven thousand feet, from the vine-clad shores of the lakes of northern Italy to the icy fields or snow-capped mountains, whose summits are never adorned by vegetation, a journey that may be made in a single day; while to descend to the level in our own land and latitude, which corresponds in mean annual temperature to that experienced at the foot of the Alps, and travel northward, we shall find in the valley of the Mississippi a diminution of one degree of temperature for every forty miles; so that to find the region where the mean annual temperature is reduced to the freezing point, we should travel over about twelve degrees of latitude. This would conduct us to districts beyond the northern borders of Lake Superior before we could pass over the same range of climatic changes as we would encounter in one day upon the slopes of the Alps.

The mean annual temperature of 32° Fahrenheit does not imply a total absence of vegetation on the plains, or in the northern districts of North America, nor the presence of eternal frost. The heats of summer extend far beyond the limits above referred to, and even Indian corn may be ripened beyond the line of mean annual frost, or of a mean annual temperature of 32° Fahrenheit in districts northwest of Lake Superior, where, in the valley of the Red river, in latitude 50° north, about sixty days of clear tropical summer occur, which are sufficient, for reasons to be hereafter cited, to ripen some varieties of this most valuable of cereal grains.

Though the correspondence between the forest vegetation on mountain sides and the distribution of trees is thus marked, there exist many circumstances which show that climatic influences alone, or as at present existing, however extensive, will not fully account for the geographical distribution of plants and animals. Their various limits do not agree precisely with the outlines indicating the intensity of physical agencies upon the surface of the earth. The limit of forest vegetation does not, as before remarked, coincide with the isotherm or line of the mean annual temperature of 32° Fahrenheit; nor is the limit of vegetation in altitude on mountain sides strictly in accordance with the mean temperature; nor are the plants and animals distributed under the different zones of climate the same in their respective zones in the northern and

* The above-cited heights are taken from Guyot's "Appalachian Mountain System," a very full detail of recent accurate measurements of most of the more elevated portions of the mountains of the Atlantic border of the United States.—See Silliman's Journal, (1861,) XXXI, pp. 158 to 187.

southern hemispheres, nor even in the same zone in the Old and in
World, certain classes of plants being exclusively circumscribed within c
regions, such as the magnolia and cactus in America, and certain an
the kangaroos in Australia, and the elephant, rhinoceros, and hippopot
Asia and Africa, which are limited to their respective districts.

Although there exists an intimate correlation between climate and veg
the temperature and other influences which constitute climate do not re
the causes which are operating or have produced these differences as
repeated under the isothermal lines, or lines of equal heat, between the e
and western shores of the Old World in the same order as along the
and western shores of North America. The similarity of the clim
eastern North America and eastern Asia, and of western North America
western Europe, originating in similarity of position as respects latitude, e
sure to ocean currents, protection by mountain barriers, &c., does not
surprise; but that there should exist in Japan many genera and spe
plants unknown except to the eastward of the Rocky mountains in
America—that the district of the lower Amoor river, on the shore of the
should produce several species identical with peculiarly eastern North An
kinds, and many others nearly allied, if not identical therewith, which
found in northwestern America nor elsewhere on the globe, is more worthy
remark; and when on further inquiry we learn that the Canary islands
Azores possess American genera not found in Europe nor in Africa, a
the lofty mountains of Borneo contain Tasmanian (Van Dieman's
Himalayan representatives, that the Himalayas contain Andean,
mountain, and Japanese genera and species, and the Alps of Victoria (a
trict of Australia) and Tasmania, assemblages of New Zealand, F
Andean, and European genera and species, the interest beco
enhanced, and the query arises, How shall all these seeming ano
similarity of product, under similarity of climate, yet wide disseven
species identical with each other, over districts between which there
exist no possible means of communication, be satisfactorily explained?
now in operation cannot be made to account for a large assemblage of
ing plants characteristic of the Indian peninsula, being also inhabi
tropical Australia, while not one characteristic Australian genus has ever
found in the peninsula of India. Still less will these causes account for
presence of Antarctic and European species in the Alps of Tasma
Victoria, or for the reappearance of Tasmanian genera on an isolated
mountain in Borneo.*

The above-cited and a multitude of analogous facts have led to the study of the agencies which may be reasonably supposed to have had an influence in determining the distribution of plants. Among these agencies may be named supposed changes of climate, which geological research seems to exhibit, arising either from direct cooling of the entire mass of the earth, or from new positions and elevations of the surface, which we cannot doubt have occurred at various epochs of the history of the progress of the earth. We shall not pause to dwell upon these most interesting problems which are tasking the learning and acumen of the most profound and acute philosophers, and which have not yet found a satisfactory solution, nor enlarge upon the nature of the facts and reasoning brought up from the study of extinct plants and animals, whose remains, entombed in the solid rock, bear witness of their former life, and of the conditions demanded for its support, but will pass to more practical applications of the general law of distribution under the regularly recurring changes of temperature now influencing the life of the globe.

* Dr. J. D. Hooker, Tasmanian Flora in Silliman's Journal of Science, vol. XXIX, pp. 19, 21.

THE DEFINITE AMOUNTS OF HEAT REQUIRED BY PLANTS.

When considering the coincidences existing between the distribution of
its, according to their respective zones of climate on plains and on zones
elevation on mountain sides, we have had especial reference to the mean
nnual temperatures prevailing in the respective regions observed. These, it
as been remarked, are in general correct as regards the distribution of forest
ees, which brave the extreme cold of winter, and require but a few months
moderate heat for foliation and for maturing their fruit. The discrepancies
und to exist between the isotherms in latitude and isotherms in elevation
more especially noted when we come to consider the arrangement of annual
its under these respective relations. Originally the mean annual tempe-
ure was alone observed, and the polar limits of plants, it was presumed,
ld be thereby determined. But opinions on the subject of polar limits, or
thermals, bounding on the north in the northern hemisphere the extension
certain species of plants, have changed with the progress of physical geog-
hy. More recently it was taught that the mean temperature of seasons is
more importance than that of the year, and that in general two similar cli-
may be distributed in fractions very dissimilar, which may neutralize
another in the estimate of their mean annual temperatures. Thus it has
observed that countries in which the summers are short but very warm,
the winters very long and cold, have a vegetation different from that of
which enjoy seasons more equable, and where the march of temperature
a month to month is more gradual, or the changes less sudden and violent,
though the mean annual temperature of both may be the same. It is, there-
e, believed that to the relative distribution of heat over the seasons rather
an to the absolute amount received through the year that we are to attribute
e fitness or unfitness of a region for the growth of certain kinds of vegeta-
on. In other words, that in a knowledge of the mean temperature of seasons,
r of monthly temperatures, we may find an explanation of the causes that
ave influenced certain species of plants in their choice of home. Also that
hey have advanced from their original centre over a continent to a certain
ne which passes through points having an equal temperature during some
eriod of the year, which may vary with various plants, and have occupied
the region to the border thus indicated, unless their extension has been
rested by a climate too dry or too humid, or by the impassable ocean.

In the progress of knowledge, it has become apparent that these lines of
qual temperature or isotherms for certain seasons do not answer all the re-
uirements of each case; that they do not limit even the extension of annuals,
hough their vegetation is confined wholly or mostly to the three months of
mmer.

It appears that the conditions which define the limits of a plant require that
should know the degree of temperature at which its vegetation begins and
ls; that at which it will flower and will mature its seeds or fruit; and also
sum of the mean daily temperatures during these periods respectively.
hypothesis that a definite amount of heat is required in order to develop
a plant in its progress from one stage of growth to another was first ad-
ced by Reaumur, better known in America from the thermometer which
s his name than through the scientific labors which added largely to the
th of his native France. This philosopher proposed to calculate the
ount of heat demanded by a plant, by multiplying the number of days re-
uired to pass through its growth by the mean temperature of the period.

To Michael Adanson, a French naturalist of comprehensive mind, great
uteness and perfect independence of thought, but too far in advance of his
ntemporaries to be rightly appreciated, we are indebted for the hypothesis
hat, by adding together the mean temperatures of each day from the com-

mencement of the year, it will be found that when the sum shall have r
a certain figure the same phenomena of vegetation will be exhibited, s
foliation, blooming, and maturation of the fruit.

Boussingault, that "prince of agronomical chemists," in whom c
successful farmer and the profound philosopher, whose "Rural Ec
should be studied by every farmer, and whose new "Agronomie" pr
more brightly to illumine his name, and the path of the scientific i
"light—more light," revived the hypothesis of Reaumur and enlarg
plication. Many years' residence in South America, engaged in i
observation and research, where vegetation upon mountain sides ap
almost every aspect and condition, combined with experience in the pr
of agriculture on his farm at Brechelbronn, in Alsace, had taught him
we multiply the number of days—the length of time a summer plant
by the mean temperature of this period, the product will be the
countries and in all years.

Baron Quetelet, of Brussels, styled by his countrymen "the Belgian A
has experimented upon the amount of heat required by plants, and pr
that it should be measured not by the simple product of the tempe
the several days by the number of days required, but that the squares
mean temperatures should be employed in lieu of the daily mean. The y
De Candolle has, however, sought in vain in the researches of Qu
others for any positive facts showing the direct advantages of the var
of heat over continuous even temperatures, or for the evidence fully d
ing that one day having a mean of 20° centigrade, is of equal value with
days having each a mean of 10° centigrade, as is assumed by Quetelet in
Bulletin de l'Academie Royale de Bruxelles, v. XIX, pt. I, p. 543.

Babinet, a distinguished physicist, has proposed a method for deter
the heat required by plants for the performance of certain functions. He
pares the action of temperature to that of a force, such as weight, which pro
duces effects proportioned to the intensity of the cause and the square of th
time. He has not, however, made experience the basis of his hypothesis, and
it is rejected by Quetelet as unsound. According to the latter philosopher, by
the hypothesis of Babinet, if one day at 20° centigrade produces a
effect, two days having a mean of 10° centigrade should produce four t
10° or the effect of 40° centigrade, and four days at 5° centigrade sh
exert an influence equal to sixteen times 5° or 80° centigrade—results whica
the general experience of horticulturists will not permit us to accept as true.

Count Adrien de Gasparin, a minister of Agriculture and Commerce, i P
of France, who, by his numerous memoirs addressed to the societies of
partments as well as to the Academy of Sciences, attained an honorable pl
among contemporary agronomes, or scientific agriculturists, has also gi
much attention to the question of the amount of heat demanded by plants.* In
his excellent Cours d'Agriculture, or Course of Agriculture, he suggests that
the mean heat of the day should be derived in part from the direct heat of the
sun, and not alone from that of the air, as is in general measured by meteorol-
ogists, because the motive power which induces the circulation of the sap is
the heat derived from the atmosphere and the soil in conjunction with the di-
rect rays of the sun. The rate of decomposition of the carbonic acid absorbed
from the air must be measured by the activity of the chemical rays of the sun,
and the growth of the plant is accelerated, we are aware, by exposure to its
full measure of sunshine. This method cannot, however, be readily verified in

* Count Adrien de Gasparin was father of Count Agenor de Gasparin, whose virtuous
generous appreciation of the importance of the struggle that now racks our nation have b
so fully exemplified in his enlightened labors in our behalf among his fellow-coun
Europe.

he actual state of meteorological knowledge. This distinguished observer llowed the vegetation of one variety of vine growing near Orange, in France, om foliation to maturity, noted the minima of heat for each day in the shade, ıd the maxima shown by the thermometer in the sunshine, but protected ıy a slight covering of earth. The mean between these minima and maxima ve, according to Gasparin, a more satisfactory number than that derived from ..her processes; and when multiplied by the number of days during which ıtation is influenced by this particular mean, results in a sum total of heat ınich varies but little from year to year at the locality where the observations ere made. So nearly do these sums agree that the presumption is strengthd that the process may be the correct one, and deserving of much more atıtion than has been awarded to it. The result of de Gasparin's experiments ın 1844 was a sum of 4195°; in 1845, 4203°; in 1846, 4057°; and in 1847, 4100° centigrade.

Among the contributions of these inquirers into the mystery of heat as apted to the wants of plants, none have hitherto elicited more interest than those of Boussingault. His method, proposed by Reaumur, appears to be logical and precise, giving results sufficiently satisfactory for determining the heat necessary for maturing annual plants, particularly the cereals in spring. He has been very happy in determining the conditions of a good vintage in his district of Alsace, and has shown that certain mean temperatures are necessary during certain eras of vegetation, and especially that a definite amount of heat is needed to insure the elaboration of a due proportion of sugar in the grape.

The principle that we must combine the values of temperature and time in our inquiries into this subject cannot be controverted, for all must perceive that heat acts proportionally as regards its duration and its force. Boussingault, therefore, asserts that if a plant has required twenty days to ripen its seed, numbering from the period of flowering, and the mean temperature during those twenty days has been fifty degrees, it will be found that the plant will have received one thousand degrees of heat. The same number of degrees of heat might have influenced the plant during a lesser number of days had the mean temperature been proportionally higher. This is well illustrated by the rapidity with which some annual plants germinate in Arctic regions on the return of midsummer heats. In these northern regions, where for a short time plants are subjected to an intense heat, often as high as 109° Fahrenheit in the shade, and which enjoy a longer continuance of the sun above the horizon than in more southern latitudes, the growth of some vegetables is said to be so rapid under assiduous culture and in genial situations that their progress may be traced from hour to hour. In Norway, in latitude 70° north, peas grow at the rate of three and a half inches in twenty-four hours for many days in summer, and some of the cereals, probably barley and oats, grow as much as two and a half inches in the same time. Not only is the rapidity of growth affected by the constant presence of the sun's heat and light, but those vegetable secretions which owe their existence to the influence of the actinic force on the leaves are all produced in far greater abundance than in more southern climes; hence the coloring matter is found in greater quantity, the tints of the colored parts of vegetables are deeper, the flavoring and odoriferous matters are more intense, though in saccharine properties the plants of Norway are not equal to those of the south.

The successful cultivation in northern countries, by artificial means, of plants naturally demanding the high temperature and long seasons of more southern latitudes do but combine the duration and degree of heat. Nor need it excite our surprise that so well defined are the laws regulating the temperatures necessarily accorded to each variety of plant undergoing these artificial climatic conditions, and so accurately determined are they by practiced gardeners,

that they have become experts to that degree that they succeed in prod the flower or the matured fruit on a given day.

While there can be no doubt that different plants require different of heat from the time of sprouting to full maturity, though the ti which this may be furnished may be different in different instances, and great heat may produce the same effect on plants which is produced by degree operating during a longer term, another principle of much must be observed in order to the successful cultivation of plants under or artificial circumstances.

This second principle is that each species requires for each one of ological functions a certain minimum of temperature, or, as has been each species of vegetable is a kind of thermometer which has its own lowest degree at which it will vegetate. A temperature above a certain mum of heat is found necessary for germination, another for one of modification, and a third for flowering, a fourth for the ripening of s fifth for the elaboration of the saccharine juices, and a sixth for the ment of aroma or bouquet. A certain intensity of light is also de render green the tissues, and a due supply of humidity in the air and soil to furnish a vehicle for the materials of growth and prevent und cation. A plant is thus not only under all the influences which affect mometer, but is likewise acted upon as is a hygrometer by humidity dryness.

From the study of special examples among plants, under the com fluences of temperature, light, and moisture, a later inquirer believes he reached most interesting results regarding the limiting effects of these towards the north, and on mountain sides. From the point of view tak this later investigator botanical geography ceases to be a simple accum of facts, takes a place among the sciences, and assumes to explain by the of the distribution of living plants the actual conditions of climate, as those that prevailed in former ages. It is to Alphonse de Candolle, who his Geographie Botanique Raisonnée, has presented to the scientific pub of the most important works that has of late appeared, and one of the generally interesting, both on account of the subjects it treats of and the ability and thoroughness with which most of them are handled, that we are debted for a clearer insight into the obscurity which has shrouded the of the geography of plants. "This work," which, in the language of Dr. Gray, "is one that addresses and will greatly interest a much broader of scientific readers than any modern production of a botanical author, which will probably long be esteemed the standard treatise upon a wide of questions highly and almost equally interesting to the botanist, the zoolo the geologist, the ethnologist, and the student of general terrestrial physics, not to be found in our bookstores, and appears upon the shelves of only one li in Philadelphia, the magnificent natural history collection of the Academy o Natural Sciences. "Truly we are an enlightened people!" A. de Candolle has proved himself a son worthy to bear the name and continue the renown of his father, Pyramus de Candolle, who was the only botanist since Linnæus that embraced all branches of the study with an equal genius, and whose works mark a new era in the progress of his science. The limits which we have assigned to this paper forbid an extended notice of this work, and we will confine our remarks to a few illustrations of the results arrived at, and refer the inquiring reader to Dr. Asa Gray's notice, in Silliman's Journal of Science, vol. XXII, pp. 429, 432, and to Hooker's Journal of Botany, spring and summer of 1856, for a more extended critique.

ON THE RANGE OF CERTAIN ANNUAL PLANTS.

› the custom to attribute the disagreement between the limits of
› lines of equal temperature to errors of observation on the locality
to uncertainty respecting the thermometric mean, or to varying de-
ıryness and humidity. But certain facts and calculations upon the
ı ːe for culture in different countries have awakened doubts of the
tnese explanations, and have led to more minute investigations.
ɔach species of plant can bear a definite range of temperature, indeed,
ı certain amount during a given period of time to enable it to perform
runctions properly, the only true indication of climatic adaptation is,
e plant, under the conditions assumed, perfect its seed and produce its
ɐetions; and more recent research has demonstrated that neither the
ɔan, nor that of the summer season, accurately indicate the northern
ɪ the extension of the range of our *annual* plants. An extended series
s of the range of many European plants, with the tables of monthly
ɑɯ and seasons over the districts where these plants naturally appear,
ɾn tnat in no case does the limit of a species exactly coincide with a
equal temperature for any one period of the year. Also, which will ap-
ore worthy of remark, that the limits of annual plants in the plains of
› cross one another with considerable frequency, and that the limits of
ial and ligneous species also cross each other in different directions, and
far from being parallel when they do not thus cross.
ɹines of mean temperature are derived from a consideration of fixed pe-
ıether of a month or of a season, while the vegetation of annuals lasts
periods which are variable, the vegetation of the plant having its com-
nent and completion at different epochs of the year dependent upon the
ɔf greater or less excess of heat when compared with the mean of the
season. There can obviously be but small agreement between these
ɹes of facts which have no necessary connexion or relation.
e Candolle has taught that if we would estimate the heat really useful to
; we must consider in our calculation those values only which are above
in degree of temperature, which degree varies with the species. This he
a field hitherto unexplored, and proceeds to explain the application of
ɔve principles in combination in European climates, by which are brought
similitudes or dissimilitudes to which the means ordinarily employed
no key.
lon and Odessa are certainly not under the same lines of temperature.
ean summer heat at London is 61° Fahrenheit, at Odessa 70° Fahren-
vhile in winter the difference is rather greater. In the monthly means
wo climates have but imperfect analogy. The monthly means at London
lessa appear to be as follows, in degrees of Fahrenheit:

	January.	February.	March	April.	May.	June.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°	°	°	°	°	°	°
.....	37.2	40.1	42.5	46.9	53.5	58.7	62.4	62.1	57.5	50.7	44.0	40.4
.....	25.2	27.6	33.1	46.4	57.6	66.2	73.3	70.8	59.7	52.3	40.0	29.4

ɐa ' conv ɔnce we will convert the above into degrees of centigrade,
of dividing thermometers, which shows but 100 degrees

between the freezing point and the boiling point of water, a graduati greatly to be regretted not yet of universal acceptance with our countrym

Thirty-two degrees of Fahrenheit becomes their zero, and as the below this point or that of freezing are of no account to us in this c we may very properly note those only above freezing or the zero or grade. We have accordingly reduced the above Fahrenheit degrees u of centigrade, and the series of temperatures for the respective months r follows:

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.
	°	°	°	°	°	°	°	°	°	°	°
London	2.83	4.50	5.83	8.28	11.94	14.83	16.89	16.72	14.17	10.	
Odessa	—3.78	—2.44	0.61	8.00	14.22	19.00	22.94	21.56	15.39	11	

Now, if we consider the time at which the temperature of 4.5° centig 40° Fahrenheit commences and terminates in each of these cities, and of the mean heat between these two limits, as shown in the above ta shall find nearly the same result. At London the mean of 4.5° centigr Fahrenheit) commences on the 17th of February and terminates on the December. Between these two periods, we find by taking the monthly and fractions for the parts of the months named—that is, 5° centigrade thirteen days of February, and 5° centigrade for the fifteen days of De which may be considered allowable since the heat of the latter part of F and earlier part of December exceed the remaining portions, we find a gate for London of 115.50° centigrade. At Odessa the temperature centigrade (40° Fahrenheit) commences later, from 2d to 3d of April, ar nates sooner, from the 17th to the 18th of November; but as it is warme summer, the amount of heat determined as above is about equal to that of being 116.39° centigrade. Hence it is apparent that a plant which v quire 4.5° centigrade to commence vegetating with a certain activity order to reach a certain stage or condition would require in all an ar heat of 115° centigrade, rated upon the monthly means, might adva northwest direction to London, and in a northeast to Odessa. If a plar require more or less than 4.5° centigrade as a minimum, or more or 115° centigrade in the whole as above calculated, the climates would r correspond, and the limit of species would be otherwise established. O has made use of the daily means in his calculation, and discovered tha commencing its growth at 4.5° centigrade, or 40° Fahrenheit, and re season extending to the return of the same temperature in autumn, w mand at London 3,431° of centigrade heat, and at Odessa would receive the same minima 3,423° centigrade. The above is a much more method of comparison; but as we have not records of daily means places at command, we have used the monthly means, which, in this pear to approximate pretty nearly to the same result. It thus appears climates which differ, when considered as regards their respective mean temperature, may yet be identical under certain combinations of the tw which affect the life of the species existing therein.

* The centigrade scale offers many facilities to calculation, and may be readily u To convert Fahrenheit degrees, the common graduation, into centigrade, observe the formula: $x°$ Fahrenheit $= (x°-32°)$ § centigrade, which means that to convert F into centigrade, deduct thirty-two degrees therefrom, divide the remainder by nine, tiply the quotient by five, for the amount in centigrade degrees.

he purpose of discovering these correspondences of climates De Can-
culated the days on which the temperature 1°, 2°, 3°, &c., up to 8°
le commence and end at certain European localities; these all being
ie freezing point, and correspond, respectively, to 33.8°, 35.6°, 37.4°,
to 46.4° Fahrenheit. At the lowest of these temperatures some forms
able life are called forth from their winter sleep. By associating with
ality noted, the product indicating the heat received in excess of each
degrees, and applying these figures to the facts of vegetation, highly
ory results are obtained. One instance we may adduce in illustration
ethod.

Alyssum calycinum, an annual plant, grows on the eastern coast of
as high as Perth. It is not found on the western coast of England,
eland, in Jersey, in Guernsey, nor in Brittany, which may be attributed
nstant humidity of those regions, for this plant loves a dry atmosphere,
ant that grows in Scotland cannot be said to find the heat of Brittany
nt for its existence. On the continent, the *Alyssum calycinum* spreads
orthwest as far as Holstein and the Baltic sea, but not into Scandinavia,
he northeast as far as Moscow, but is not found in Kazan in about the
itude, though further east, and reappears in the governments of Pensa
brinsk, but little south of Kazan, and again in the Steppes between
a and the Ural. The limits where its extension may be thought to be
ed solely by temperature stretches, therefore, from near Perth, in Scot-
der the parallel of 56½ degrees of north latitude, passes along the 54th
n Holstein, and thence oscillates in Russia between the 55th and 56th

This line varies widely from any line founded on equality of temper-
any season or month of the year. On examining a table of daily
ures, it appears that at or near Perth, in Scotland, the temperature of
rade, about 45° Fahrenheit, or upwards, continues from the 18th of April
1st of October, and that, during this time, the product of the days by
n temperature amounts to 2,281° centigrade. At Kœnigsberg, on the
he temperature of 7° centigrade and upwards is of shorter continuance,
summer being hotter, the product amounts to 2,308°. As the limit of
ies is about sixty miles to the north of Kœnigsberg, this figure must be
and thus more nearly resembles that found for Perth, in Scotland. At
the mean of 7° centigrade commences on the 22d of April, and termi-
the 5th of October, the product in consequence of the heat of summer
2,473°. This is more than is necessary for the *Alyssum* which probably
s more than one hundred miles north of Moscow. At Kazan the figures
196°, so that it is not surprising that the *Alyssum calycinum* has dis-
l. Thus the hypothesis of 7° centigrade for an initial temperature or
n at which this plant commences to vegetate, and 2,280° to 2,300° for
tity of heat demanded, accord completely with the facts.

er instance may be adduced of conformity of facts with figures derived
perature. The *Euonymus Europœus*, or European spindle-tree, nearly
o the burning-bush of our gardens, has for its northern limit the north
nd, Edinburgh, in Scotland, the north of Denmark, the south of Swe-
isle of Aland in the Gulf of Bothnia, latitude 60° north, Moscow,
t to Penza, in Russia, in latitude 53°, through a latitude of seven

The mean annual and mean summer temperatures vary several
at these places when they are respectively compared, nor do the
temperatures agree much more nearly. The *Euonymus* requires a
ure of 2,480° centigrade, the sum of the daily temperatures between
epochs of the year when the curve of mean temperature ascends
° centigrade. At Edinburgh this is found to be 2,482°. At Stock-
eyond the limit, the sum is but 2,268°. At St. Petersburg, like-
yond it, it is too small. At Aland there may exist a more elevated

temperature due to the surrounding water. At Moscow, where the plan the sum exceeds the supposed condition, and the *Euonymus* doubtless exi here further north. Finally, at Kazan this figure is reduced to 2,250°, the plant does not appear. The values thus found along the limit in its ne borhood, and beyond it, accord as nearly as could be desired with the hypothesis of a minimum of 6° centigrade, and an aggregate tempe the growth and maturation of *Euonymus Europæus* of about 2,450° grade.

De Candolle considers himself justified, by the results derived from t vestigation of the limits of the northern extension of nearly forty spec plants, to enunciate the law of nature that "every species having its limit in central or northern Europe advances as far as it finds a certain amount of heat, calculated from the day when a certain mean tempe commences to the day when that mean terminates." The apparent ex to this rule may be explained by two circumstances which restrict its tion. The eastern and western limits of a species may be (ed humidity or dryness of portions of the region over which it would (extend, or perennial and woody plants are sometimes arrested in their sion towards the north by the absolute minima of temperature. In tr limit of a species from east to west, if the law as stated ceases to be app the species may be supposed to have encountered the excluding influ severe cold or excessive drought or humidity, and it is often difficult which of these causes operates as an obstacle.

THE TEMPERATURE AFFECTING THE VINE.

There are few crops that are so much at the mercy of the atmospher varying conditions as that derived from the vine. Even in vineyards most favorably situated, it is rare that wines of equal quality and fl produced in two consecutive years; and in districts upon the verge of ductive limits of the vine under extreme climates, where it exists only of hot summers, its produce is still more variable, more inconstant.

The limits to the culture of the vine in Europe are generally fixed ' mean annual temperature is from 50° to 52°. Under a colder climate i no potable wine is produced. To this meteorological datum must be a fact that the mean heat of the cycle of vegetation of the vine must be 59° Fahrenheit, and that of the summer from 65° to 66° Fahrenhe country which has not these climatic conditions cannot have other th ferent vineyards, even when its mean annual temperature exceeds th indicated. It is impossible, for instance, to cultivate the vine upon perate table lands of South America, where they nevertheless enjoy a from 62.6° to 66.2° Fahrenheit, because these climates are chara constancy of temperature, never rising to the higher heats necessar process of sugar-forming, and the vine grows, flourishes, but the gra become thoroughly ripe. Even in Europe, where the climate parta regularity that to us is remarkable, the varying temperature of the mean from year to year produces a corresponding variation in the q the wine. This quality may, in good measure, be tested by the a alcohol contained therein, as this is directly as the amount of sugar (by the heat of the summer months, or by the epoch of its growth, duri the sugar-forming process takes place.

A series of observations, from 1833 to 1837, inclusive, made in] shows the following results, which may be better understood if placed ular form :

	MEAN TEMPERATURES.			PRODUCTS.	
	Temperature of cycle of growth of vines.	Temperature of summer.	Temperature of beginning of autumn.	Wine, per acre, in gallons.	Percentage of pure alcohol.
	°	°	°		
.....	58.46 Fahr.	63.14 Fahr.	52.52 Fahr.	311	5.0
.....	63.14	68.54	62.60	314	11.2
.....	60.44	67.10	54.14	621	8.1
.....	60.44	70.70	53.96	544	7.1
.....	59.40	65.66	53.42	184	7.7

perceive that the mean temperature of the period, during which the maturation of the grapes take place, exercises a very remarkable The temperatures of the summer and autumn of 1834, and consequent of the entire growing season, were decidedly greater than that of noted above, and in the same year the strongest wine was produced. ature of the beginning of autumn—September, of 1835—is next in gher than that of the remaining years, and though the summer of armer, we find the wine of 1835 superior to that of 1836. This cates that a summer heat, prolonged into the autumn, is of more high summer heats, with a lower temperature, later in the season. f the wines produced in the remaining years is nearly in accordance nperature of the beginning of autumn, or the month of September, 1833, when the growing season was the lowest, and that for Sepced to a minimum, the wine, it is said, was scarcely drinkable. temperature, therefore, of the summer is not a safe criterion for the adaptation of a district to vine culture. A mild autumn must as one of the essential conditions, and, consequently, the mean for eriod of growth where the higher heat is near the termination of that ies a better evidence of fitness of any region for producing wine of the lity. This truth is strongly indorsed by the observations made in narkable over Europe for the quantity and excellence of its wines. known as the "comet year," was distinguished by the high temthe early autumn. Though the summer mean was lower than he years above tabulated, and about an average, the months of Sep-October were maintained at 59° Fahrenheit, while the usual temthese months had not been higher than 52.7° Fahrenheit, or nearly es lower. Boussingault, to whom we are indebted for much of the meteorological conditions necessary to the production of wine of lity, has expressed his conclusions in the following terms:

dition to a summer and an autumn sufficiently hot, it is indispensable that iod—that which follows the appearance of the seeds—there should be a month perature of which does not fall below 66.2° Fahrenheit."

wi ; table illustrates the cultivation of the vine in Europe, and also n of its produce according to climatic relations. Cherbourg in m northwestern France, Dublin, and London, show, in a remarkahow, with annual mean temperatures about the same, or higher than eral places in the interior of the continent, and a winter temperamilder, yet the summer heat falling several degrees below, and the of the hottest month differing more widely, the grape cannot be Ireland, Britain, or Normandy. The more general prevalence of

a clouded sky at the above-named places may in a measure ac
lower temperature for the summer months as observed in
strengthen the credibility of the results of the observations o
who appears to have proved that the ripening of fruits depends
illuminating rays than on the calorific and chemical rays of the sun.

*A table illustrating the temperatures required for the production of wi
and excellent quality at certain celebrated localities in Europe.*

Locality.	Annual mean.	Summer mean.	Autumn mean.	Mean of hot month.	Hot months.	Remarks.
	°	°	°	°		
Dublin	50.0	59.6	53.0	61.0	July and August	Vine not cultivated.
London	50.0	62.0	51.0	63.2	July	Do.
Cherbourg	52.0	62.0	54.4	63.2		Do.
Kœnigsberg	43.2	60.6	44.4	62.6		Never ripens the
Berlin	48.1	64.5	49.2	65.8	July	Wine, very poor.
Paris	51.3	64.5	52.2	65.6	July and August	Wine, not good.
Frankfort	50.3	65.0	50.0	66.0	July	Acid wines.
Würzburg	50.2	65.7	49.4	(?)	....do	Leistenberg wine, fin
Vienna	51.0	69.4	51.2	70.0	....do	Better than Rhine wi
Toulouse	55.2	69.1	56.5	71.5	August	Strong wines.
Dijon	53.0	69.6	53.3	72.5	....do	Fine Burgundy.
Bordeaux	57.0	71.0	57.9	73.1	July and August	Very good clarets.
Lisbon	61.4	70.0	62.5	72.0	....do	Very good.
Cadiz	62.0	70.4	65.3	72.8	August	Do.
Madeira	65.5	70.0	67.7	72.1	....do	Excellent.
Marseilles	58.3	73.0	59.2	76.0	July and August	Very strong wine.
Naples	60.3	74.4	61.4	76.3	....do	Super-excellent.

In the plains near the Baltic, in northern Germany, a wine is prod
is very acid and scarcely potable. The summer mean between 61°
Fahrenheit, being too low, and even the temperature of the hot
falling below the limit of 66.2° Fahrenheit.

The mean summer temperature of Würzburg, in Franconia, is 65.7°,
degree above that of Berlin, while its hottest month cannot be more t
degrees higher than the hottest in the latter district; and when the
qualities of the wines produced in Franconia, and in the countries
Baltic, are compared with the mean summer and autumn temperatu
spectively, we are almost surprised to find a difference of only al
degrees.

While the wines of Berlin are very inferior, and indeed unworthy
name, those of Franconia, whose chief city is Würzburg, are h
esteem. The Leistenwein, one of the kinds here produced, is este
justice the second finest wine of the south of Germany, and the whole
of the small space on which it is grown is secured for the table of the
Bavaria, and is scarcely known, and can seldom be purchased. D
there are local influences affecting the quality of the product, or which
the temperature above that of the surrounding region and as
closely to more southern districts, where wines stronger in alcono
It is, however, acknowledged that the choicest variety of grape
the utmost care exercised in the selection of the most
it is only by managing both the culture of the vine and the

the most skilful manner, and preserving the result until it shall have ed the highest degree of perfection it can attain by age, and selling as oduct of this celebrated vineyard only such vintages as are calculated to e or maintain its celebrity that a reputation has been obtained and red.

n in the land of the vine all seasons are not alike propitious. An ex- ion of a tabular view of the vintages of four of the most diverse and ted wine countries, extending from almost the western to the most points, where famous wines are produced in Europe, exhibits the un- ty attending the production of a good or fine vintage even in the favored f the vine. This table extends from 1775 to 1842, and by it we find r the sixty-eight years noted, that there were of the following varieties,

Port.	Claret.	Rhenish.	Tokay. (1783 to 1831.)
very fine, fine, or good.	9 years, first-rate, very good, and good.	16 years, very good, or good.	12 years, good, &c.
middling.			20 years, middling.
inferior, bad, or very	59 years, either middling, bad, or none produced.	13 years, middling. 39 years, inferior, or bad.	17 years, bad.

lom did three good or middling good years occur consecutively, while in nenish provinces three, four, or five bad years have thus occurred. The sion "good" refers to quality only.

ference to the Wine Chronicle for 432 years, from 1420 to 1852, exhibits narkable facts, that out of this long series of more than four centuries were but eleven (11) years that were eminently distinguished for the or quality of the wine produced; twenty-eight (28) very good years; undred and eighteen (118) pretty good ones, producing a good wine; y-six (76) that showed a middling quality of wine; and one hundred inety-nine (199) inferior. These four centuries and a third exhibit one ed and fourteen (114) years of ample yield; eighteen (18) of middling t; ninety-nine (99) of poorer, and two hundred and one (201) failures, id not pay the expenses of labor, &c. Thus the crop was seriously l three years out of four. Think of this, ye complaining vignerons in stern sections of the United States, who are discouraged if but a few drop from mildew; who talk of "rot," and "shrivel," and insects, as if nly were not the favored ones, and they only endured a climate where growing cannot be made profitable. Here are wide districts of country staple crop and main dependence is the vine, which fails one-half of the nd for three years out of four is seriously injured. How will the assertion ur country is not adapted to the growth of the vine be sustained, when ow that we have districts east of the Mississippi where it has not for en years, probably the entire period since it was planted, failed to mature l crop of grapes, and a wider district in California where no report of a of failure has reached us, even by the mouth of tradition.

a further examination of the preceding table of annual, summer, and means, we observe that as we proceed towards the south, other circum- s being favorable, the temperature of the hottest month increases, and the quality of the wines. The wines produced in the region around s, in Austria, are better in general than those of the Rhine; those of ndy have long been famous. These districts enjoy a month having a ture of 70° and 72° Fahrenheit, respectively.

The vineyards near Bordeaux, which produce the highly prized clarets a high summer mean of 71°, and two hot months of 73.1°, July and. and a September of 67° Fahrenheit. The mean of June is ab minimum of 66.2°, being nearly 70°. These are circumstances very fa to the production of superior wine.

The wines of Languedoc, Provence, and Roussillon, in the south ern of France, are remarkable for fulness of body, but they want the bouquet of the wines of the Rhine. Their summer temperature enjoyed by any districts of France—that at Marseilles exhibiting a mean of 73°, while July reaches nearly to 76°, and August to 72°.

Lisbon, Cadiz, Madeira, and Naples enjoy a very high measure of heat and a hot August, the most favorable for the development of matter, and the wines of the adjoining districts are celebrated the v

In the most northern point of the district where the grape is grown, Kœnigsberg, it ripens only in warm summers, and is deficient in sugar taining only a glutinous muco-saccharine matter; while in the southern re the sugar is actually crystallized, and the grape is devoid of those acids are requisite in order that the wine may possess flavor and those other which distinguish wine from a mixture of syrup and alcohol. Th limits of the wine region thus offer extreme conditions of the pro almost solely upon the relative degrees of summer heat or the te July or August.

THE SELECTION OF VARIETIES AND THEIR ADAPTATION TO THE SPECTIVE DISTRICTS.

In the wine countries of Europe the utmost regard is paid to the selection of varieties adapted to the respective districts, yet with all t and long experience the years of failure outnumber those of success. Rhine, the Little Riessling *(Der Kleine Riessling) Vitis vinifera pu* Babo and Metzger, is generally cultivated. This variety produces the Johannisberger, as well as many kinds of wine much inferior. The of Prince Metternich, to whom the Johannisberg belongs, is protected castle wall and a stone wall ten feet high, which occupied ten years ing. This greatly promotes the steady progress towards maturity b ing a quiescent state of the air, which is known to be extremely b The wine of Lugisland and the Liebfrauenmilch owe their super that of the neighboring vineyard to the protection afforded by the w of Worms. The advantages of protection against agitation of the air understood in the Rheingau, or the "Rhine country," a valley of N ebrated for its rich vineyards, and the belts of vineyards which c height of Hockheim produce very different wines, according to ir One morgen, about one acre, close to the bed of the river Main, or market two thousand florins; a higher morgen brings one thou and one at the summit only five hundred. The difference between wein and Steinwein, both the produce of the banks of the Main, is e by the fact that different kinds of grapes are grown in the two vineya why these two wines should differ from all others in the district has satisfactorily ascertained.

While we would not advise a close imitation of many practices o Germany and France, such as laborious and exper re tous heights of rocky steeps and planting vines in ba nousing upon ledges among the rocks, as we have seen in many stances Rhine, nor loading the backs of women with baskets of mar e with climb the hills called the Coté d'or, in Burgundy, as has to witness a common practice, we may yet learn much f

e gathered by the observant and laborious vine-dressers of German-

other points worthy of attention, let us not fail to remark that the
of varieties of the vine is always made with special reference to the
Those that will bear a lower degree of heat and ripen are selected
ore northern latitudes and exposures; and as we progress towards
towards warmer summers and longer continued heats of early au-
e tender varieties are grown. We have said that the Kleine Riess-
tivated on the Rhine, and that from this the finest wines are made.
other varieties in this section of nearly equal merit, as the Traminer
ifera Tyrolensis) and the Elbling grape, *(Vitis vinifera albuelis;)*
Traminer, called Franken, by some Gutedel, *(Vitis vinifera ami-*
l, finally, the Hermitage, brought from France. Vineyards planted
irst two varieties are generally superior to those which contain the
nd Elbling. Rulænder, Black Clævner, and Sylvaner are grown
nferior localities or for their early ripening and productiveness.
Burgundy district, on the Coté d'or, or Golden Hills, which extend
f eighty miles from N. NE. to S. SW., and are about 200 to 300
the variety of grape grown is the "Pineau," small and black, with a
ch and a light product per vine, and from 8 to 12 barrels per acre.
grow the "Gamai" grape, which much resembles the "Pineau," but
es and berries are larger and the product three times as much as that
ineau," but a much inferior wine.
nes of the Medoc, the clarets of St. Julien, Margaux, Lafitte, &c.,
from the grape called "Cabernet" principally.
eet wines from the south of France termed Frontignac, Lunel, and
s, are from the muscat grape, which on the Rhine will ripen only
iently to furnish a grape for the dessert. Further south in France,
proach the shores of the Mediterranean, we find the vine flourishing
aying its choicest fruits under circumstances which it would not en-
ie departments of the north. Instead of a methodical arrangement
and the close-cut appearance of a plantation of hops on poles short-
alf their usual height, which the vineyards of the north most nearly
we find in the south the long branches of the vine ranging over the
en olive trees, or on high espaliers, or intertwining its shoots with
d or the elm.
nes of Spain and Italy possess qualities derived from the increased
heir more southern latitude. In Spain the "Pedro Ximenes" is the
monly esteemed. The wines of Spain are mostly rich and sweet, at
e preferred by the people, such as Malaga and Alicant; while they
ose which contain more alcohol to foreign consumers. Among the
is Sherry, which is made in Andalusia, near Cadiz, on the west coast
on the hot and chalky hillsides of this district.
, the principal wine grown near Naples is the "Lacrimæ Christi," a
wine which holds a place in the foremost rank of the first class pro-
any country; and truly can we indorse the opinion, if a judgment
y thirsty climbers up the jagged cinders of the cone of Vesuvius,
se summit we have imbibed draughts of this peerless vintage grown
rm volcanic ashes of the mountain side, can be deemed sufficiently
ted.
ve seen from the foregoing notices of the popular varieties of Euro-
e grapes, that certain kinds are adapted to certain districts of the
s or zone in Europe, where Riessling, Traminer and Rulænder,
ıa Gamai, Cabernet, &c., may be the representatives of our Delaware,
linton, Concord, our Norton's Virginia, and Catawba, and many others,
which finds its appropriate location in a district whose warmest month

occurs at the period of growth best fitted to develop the sugar, and autumn is sufficiently long for the perfection of the fruit. We have see by the table of comparative temperatures for summer, and the hottest; that those places in the wine regions on the north, having a mean t below 66° Fahrenheit, produce no good wine; that as the temp July rises, and the highest heat occurs in August, as we proceed s wines, as those of Burgundy and Lisbon, improve in quality until we r highest temperature in July and August near Naples, and with it the excellence.

This hasty sketch of the chief varieties of grapes grown for the of the best wines of Germany, France, Spain, and Italy, with notices o climatic peculiarities adapted to each class, has been made for the impressing more strongly upon our incipient wine-producers, who seem upon diverting this fruit from its true purpose, the dessert and the c the production of a fluid of questionable utility in its more diluted an condition, certainly injurious in its stronger states—the importance of ing each for his own district those kinds only which are adapted by tion to the temperature and other peculiarities of each zone or gr re our Atlantic States. That such zones exist has already been made clear to those who have brought an intelligent understanding of the to the study of an article on the "Climatology of American grape vines" report of the Department of Agriculture for 1862, to which the rea ferred for further information.

Different climates impress upon the grape peculiarities easily i in the wines produced by the same kind of grape grown under di fluences. Thus the German Hock grapes yield a wine possessed of qualities when grown along the Main or the Rhine. The same sort of grown near Lisbon yield the Bucellas wine, which retains some of peculiarities of the original, while the same grapes grown at the C of Hope yield Cape Hock bearing scarcely any resemblance to the true. and the Sercial of Madeira, produced by the same sort of grapes, though a cious wine, has scarcely any qualities, except durability, like that of the or

The experience of the European vigneron of the effects of climate in fying the quality of grapes and their product is paralleled in our own In the above we may find an explanation of widely diverse views of in different sections, and the varying estimates placed by them upon of Concord and other American varieties.

A cultivator on the banks of the Hudson denounces the Concord having a thick, acid pulp, repulsive, "fit only to sell to those who do not it," and exhausting his enthusiasm in raptures over the "Delaware,' opinions indorsed by the experienced editor of a horticultural journal; a extensive grower in Missouri asserts that the Concord grown in hi is almost without pulp, of fine flavor, thin-skinned, sweet, and very scarcely inferior to the Delaware, which he cannot succeed in gro fectly. Were the influences of climate and location properly rega lowance made for the increased temperature of western localities, e same latitude during the ripening season, such wide diversity of opinion be readily understood and acknowledged to be honestly enterta graceful personalities be laid aside. The genial sun of the Mi dissolves the pulp of the Concord grape, and sweetens and matures beyond anything that the summers in the valley of the Hudson rendering it decidedly better than the Catawba, while it is much more tive, healthy, and hardy. As the cultivation of the Concord is ex ther south on the Atlantic slope, its qualities improve from the inc of summer in lower latitudes.

ison of temperatures in the valley of the Hudson may be made several points in the valley of the Mississippi, in Iowa, Illinois, and means of the following tables. Let West Point, in the valley of , latitude 41° 23′ north, where observations have been made for 31 years, be compared, as regards the mean temperatures for the ing which vegetation is active, with old Fort Armstrong, Rock ois, latitude 41° 30′ north, where observations have been made for eleven years.

	March.	April.	May.	June.	July.	August.	September.	October.	Summer.	Autumn.
	°	°	°	°	°	°	°	°	°	°
....	37.63	48.70	59.82	68.41	73.75	71.83	64.31	53.04	71.33	53.19
....	37.82	51.06	62.70	71.39	76.49	74.47	63.90	52.26	74.12	51.73

nt and Fort Armstrong are in nearly the same latitude, and yet we mean temperatures through the months of April, May, June, July, are about three degrees higher at the latter than at the former s excess of summer heat in the valley of the Mississippi becomes n we compare the valley of the Hudson with points in Illinois and ther south. Such a comparison must be instituted in order to ren- ainly apparent the cause of the discrepancy between the grape- liverse opinions residing at the respective localities, whose summer s we propose to compare. Taking West Point again as a repre- the valley of the Hudson, we have for—

	March.	April.	May.	June.	July.	August.	September.	October.	Summer.	Autumn.
	°	°	°	°	°	°	°	°	°	°
York.	37.63	48.70	59.82	68.41	73.75	71.83	64.31	53.04	71.30	53.20
wa...	38.20	56.80	65.30	74.20	82.50	77.50	71.50	54.10	78.10	55.30
.....	39.60	57.90	65.60	71.80	79.40	77.40	73.00	56.00	76.20	57.20
ıri....	44.40	58.30	66.40	74.00	78.50	76.50	68.70	55.40	76.30	55.00
ı.....	.....	.....	.....	.....	.....	.....	.....	.....	77.90	56.80

may observe a difference of from 6 to 9 degrees of temperature vestern localities named over those of West Point from April to and that while the March mean is somewhat higher in the west, il is much greater, thus starting vegetation earlier and urging it y. This excess is continued through the summer until it is at its ly; and, while West Point has a mean of but 64.31° for Septem- es named in Illinois and Missouri enjoy a mean heat 4 to 9 degrees nt of 68.7° to 73° Fahrenheit, a temperature adequate to the ripen- naturing grapes for which that of West Point is not fitted.

nore clearly to illustrate the comparative temperatures of the wine Illinois and Missouri, and those of France, Spain, and Italy, we ble of mean temperatures for sundry places of observation in the l countries :

	March.	April.	May.	June.	July.	August.	September.	October.	Summer.
	°	°	°	°	°	°	°	°	°
Toulouse	46.8	53.5	61.0	66.0	70.1	71.1	65.2	56.4	68.
Dijon	48.2	51.1	60.6	66.0	70.2	72.5	62.4	53.8	68.
Bordeaux	51.3	56.1	60.8	66.9	73.1	73.2	67.1	58.1	71.
Lisbon	56.3	59.0	63.6	69.4	72.1	71.2	69.4	62.6	72.
Cadiz	55.2	59.6	63.7	68.1	70.2	72.8	70.2	67.1	72.
Madeira	62.6	63.5	64.6	67.2	70.1	72.1	71.6	67.1	69.
Marseilles	48.4	56.1	63.2	71.0	75.9	71.9	68.7	58.7	73.
Naples	51.2	56.7	64.8	70.8	76.1	76.3	69.3	61.9	74.

On comparing the above table with that of the means for several pl the Mississippi valley, on page 485, it will be observed that the t for March are much higher than those observed in Illinois and those for April and May, at Bordeaux, Marseilles, and Naples, more accord with those of our western wine region. June, July, and Au Mississippi valley, are much hotter than the hottest wine districts of E nearly the same latitude; and September exhibits a parallel nearly ap ing the European means, while October in the west has fallen sadly aw the high measures known throughout the wine region bordering the M ranean, reducing the autumn mean and shortening the season of The latter mean does not appear to be higher than that of Bordeaux, a lower than in the more favored localities where the strongest wines duced; but as September is still very warm and adequate to the ripe many tender varieties of grapes requiring a long season, the wine re Illinois and Missouri may be esteemed comparatively well adapted to duction, in favorable situations, of wines of very good quality.

REASONS WHY THE EUROPEAN WINE GRAPE CANNOT SUCCEED IN THE E UNITED STATES.

De Candolle, assuming that the vegetation of the vine comm centigrade or 50° Fahrenheit, and employing this minimum as the n tation both in spring and autumn, finds, by comparing the aggregate enjoyed at several places during the existence of this term and upwa within and without the region of successful vine culture, that it ducted with good promise of remuneration in Europe on slopes wea and at those localities which exhibit the sum of 2900° centigrade, day when growth commences with the mean of 10° centigrade in the that on which this mean ceases, provided the number of days of rain exceed twelve days per month. An advantage is found to arise in ta count of the number of days of rain rather than of the quantity, for we in this manner a very important circumstance, the mean condition of th more or less cloudy. As the number of rainy days increases, the heat by the vine will be diminished, and the chemical influence of rays of the sun be much impaired. Thus this varying element, neglected in making up the sums of temperature in the shade, an it is impossible to estimate at many localities, is recognized in anot definite form by stating the number of days of rain. Unfortuna meteorological records do not furnish us with these desirable facts.

The reasoning which appears satisfactory as regards the infl and number of rainy days in the European wine districts does not

the cultivation of the grape in the United States east of the Mississippi. eCandolle has sought for the causes which have prevented the successful cul- re of the grape in the middle regions of the United States, and has failed to scover the reason why it has been abandoned and its place supplied by na- 're varieties. He concludes that there is nothing either in the means or the of the temperatures or the number of days of rain that can be shown to be iurious to the vegetation of the vine, but suggests that in abundant rains, ecially at the period of blooming, which are known in Europe at those aces where the vine has not prospered, combined with other circumstances hich have eluded his research, such, perhaps, as diurnal variations of tempera- or the humidity of the soil, we may find the true obstacle to the successful ıture of the European wine grape in the United States.

It is doubtless to the variable quantity of atmospheric humidity which char- terizes the climate of the eastern United States that we ought to attribute e failure of attempts to cultivate the wine grape. Periods of excessive heat d saturation continuing from two to eight days are common in the American mmer, but are rare in Europe. The maximum of 100° in the shade is fre- ıtly observed in Canada, and south of Boston the mercury may be confi- ıtly expected to make one or two visits to the region of 95° and 98° at one more times during "the heated term." This high heat of 95° is sometimes tended by saturation with moisture, and at such times becomes destructive to ıman life by causing exhaustion or depression of the vital powers through e joint action of heat and humidity. When the highest measure of 100° to 4° which have been observed occur, when the air is very dry, equally inju- ıus consequences must follow to tender vegetation from the destructive dry- g of the tissues. In the eastern United States there often occur periods of veral days which are burdened with excessive moisture alternated with pe- ıds as marked by excessive dryness to which we find no parallel in the wine stricts of Europe. Our average of atmospheric humidity is, however, very w, as is indicated by the prevailing forms of vegetation. Our forests do not ound in mosses except in elevated districts. The grasses furnish evidence aridity which cannot be readily overlooked, and fail to cover the earth with ırennial verdure, as in the moister climate of England and western Europe. uth of the parallel of 38° north latitude the introduced grasses cannot be ltivated.

Though the uplands of Georgia and the interior northward to Pennsylvania, stricts in which the cultivation of the European wine grape has been at- mpted without success, have many points of resemblance with those of rance as respects capacity for cultivation, in the extremes of dryness and hu- idity they present no features in common. It is to these extremes we must ıibe this wide disparity, for in our country it may be said to be alternately o dry or too wet, too warm or too cold, to conform to the corresponding pe- ıds of the life of the vine as experienced in France.*

It is exceedingly difficult to obtain observations which may be properly mpared because of the different local conditions of the experiments. A de- sive mode of comparing the humidity present in the atmosphere of America ıd England may be found by measuring the quantity of water naturally aporated from an exposed surface. The following will serve to show the ference between the evaporating powers of the air in England and in the nited States:*

*Blodget's Climatology of the United States, pp. 226, 229.

Quantities of water evaporated in inches of depth.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
Whitehaven, English mean of six years..	0.88	1.04	1.77	2.54	4.15	4.54	4.20	3.40	3.12	1.93	1.32	1.09	
Ogdensburg, N. Y., one year.....	1.65	0.82	2.07	1.63	7.10	6.74	7.79	5.41	7.40	3.95	3.66	1.15	43
Syracuse, N. Y., one year.....	0.67	1.48	2.24	3.42	7.31	7.60	9.08	6.85	5.33	3.02	1.33		

The first series of quantities above given for Whitehaven, in one of humid districts of England, was carefully observed from 1843 to 1848 by e orating from a shallow copper vessel one and a half inch deep, filled and protected from the rain. The annual fall of rain at this place v inches, and the amount evaporated was in excess of the rain fall; but much less is evaporated than falls each year. In the United States the e tion is always much greater from a vessel thus supplied and protected rain than the actual depth of rain precipitated, and we may ass evaporation from a reservoir surface, when compared with the quantity of r be, during the summer months, as two to one, or twice as great. The abso power or capacity of the air of England is thus strongly contrasted with of the United States, the air of the former, under similar conditions, taki but half the quantity evaporated in the latter. And though the may be an extreme one, and not fully illustrative of the conc atmospheric capacity for moisture as it exists in France and Germany, ye difference will be found one of degree merely, and the average dryne American air will prove still largely in excess of that of western Euro

That it is to excessive atmospheric humidity, alternating with aridity, both combined with high temperatures, that we must ascribe our failure w cultivate the European wine grape, is attested by the success with which American varieties are grown under circumstances which combine temperature with more uniform humidity, and our ill success when we at the extensive cultivation of even our native sorts in localities which are s to the above extremes. In the districts where the Isabella and Catawba largely and profitably grown, the vineyards are either surrounded by w so influenced thereby as to enjoy a comparatively humid atmosphere c with more moderate summer maxima and long continued autumn heat. the Croton Point vineyards, of Dr. R. T. Underhill, are nearly surrou ed by water. The vineyards on Kelley's island, Lake Erie, where the Isabe Catawba of superior quality are grown very extensively, and with uniform success from year to year, are directly under the influence of the lake waters, whose equalizing effects upon the humidity of the air upon its borders must be as marked as is that it exerts upon the mean temperature of sun and its lengthened autumn.*

* An illustration of the influence of the lake in regulating the phases of the vegetation in the region round about may be found in the following, furnished by George C. Huntington, an intelligent meteorologist and vine culturist, of Kelley's island. He has observed that the Isabella and Catawba grapes are uniformly in full bloom on the 20th of June, and accounts this remarkable uniformity by ascribing it to the influence of the lake, the temperature whose waters scarcely vary at this season, having, on the 30th of June, exhibited a mean sixty-nine degrees, Fahrenheit, through a series of five years.

THE TEMPERATURES REQUIRED BY THE AMERICAN GRAPE-VINE.

he following table will exhibit the time of leafing, blooming, and ripening
velve of the new varieties of native American grapes at Waterloo, New
latitude 42° 55′ north, longitude 76° 50′ west, in the summer and
1 of 1862, which appears to have been a favorable season, unattended by
unusually unpropitious circumstances. This table, also, shows the number
ays from leafing to blooming, the average temperature of each period, and
n of the mean temperatures for the same, derived from a neighboring
rological station; also, the number of days between blooming and
urity, the actual average temperature, the sum of the mean temperatures for
ıe, total number of days from leafing to ripening, average temperature
entire epoch of growth and aggregate of heat required to perfect the fruit.
nave superadded a column of time of stoning, based upon the time of color-
dating three weeks anterior to the latter appearance, which is very nearly
ct. From the latter epoch we have calculated the temperature for the
th following, from actual observations, and have appended remarks upon
uality of the product.

he attentive observer of this table will find much therein to interest and
ct. He will remark the order in which the varieties are arranged is not
a upon their respective early leafing or blooming, but upon the order of
ıing and the aggregate amount of heat required for the entire cycle of
rth; that while the average temperature for the term from leafing to
ming remains about 59°, the number of days required by the different
s varies but slightly, except in the Clinton and Isabella. The amount
received during this stage ranges from 1893.33° in the Clinton to
3.00° in the Delaware; also, that the period comprised between blooming
ripening varies much more widely, from 77 days, required by the Dela-
, to 111 days, which were inadequate to the maturation of the Anna. He
perceive that the varieties first in order enjoy during this period the favor-
temperature of about 68°, which appears adequate to their ripening, and
the sum of heat received during this period is generally much less than
required by those lower on the list, which do not indeed properly mature,
whose mean temperature is lower because of the prolongation of their
d of growth into a cooler season.

roceeding further, we note the total number of days required from leafing
aturity to vary from 122 days in the Delaware and Hartford Prolific to
and beyond in Anna, which did not ripen. The average temperature for
ntire period of growth varied but little, but the entire amounts of heat are
ly different. Finally, that those which attained the highest perfection
yed the highest heat during the month following the commencement of the
ng process, and that those whose temperature at this time fell to 67° or
abouts were of but indifferent quality, and that those which were below
did not ripen at all.

Dates of leafing, blooming, and ripening of sundry varieties of native grape-vines, as observed at Waterloo, New York, in 1862, *by F. C. Brehm, and reported in "The Horticulturist," volume XVIII, pages* 52 *and* 53, *with average temperatures and aggregates of heat required during each period of growth, derived from daily and monthly means reduced from observations made at a neighboring station.*

	Temperature at date of leafing.	Date of leafing.	Days from leafing to blooming.	Date of blooming.	Average temp. from leafing to blooming.	Sum of heat required to blooming.	Date of stoning. (calculated.)	Temp. of month of stoning process.	Days from bloom to ripening.	Date of ripening.	Average temp. from bloom to ripening.	Sum of heat required from bloom to ripening.	Number of days from leafing to ripening.	Average temp. of entire period from leafing to maturity.	Aggregate heat for entire period.	Quality, &c.
	°				°	°		°			°	°		°	°	
Delaware	52.41	May 14	45	June 28	59.52	2678.66	Aug. 1	69.00	77	Sept. 13	68.17	5249.00	122	64.98	7927.66	First quality.
H. Prolific	52.41	May 14	44	June 27	59.03	2607.66	Aug. 9	67.14	78	Sept. 13	68.32	5319.66	122	64.98	7927.66	Ordinary.
U. Village	51.66	May 12	45	June 26	58.95	2653.00	July 21	68.58	80	Sept. 14	67.95	5436.66	125	64.71	8089.66	Good.
Clinton	51.66	May 12	32	June 13	59.16	1893.12	July 24	69.43	95	Sept. 16	66.52	6319.66	127	64.67	8213.00	Good for wine.
Diana	51.40	May 10	44	June 23	58.66	2581.66	Aug. 1	69.00	89	Sept. 20	67.31	5990.66	133	64.45	8572.66	Next to Delaware.
Concord	52.71	May 15	42	June 26	59.13	2483.66	Aug. 9	67.14	91	Sept. 25	67.30	6124.66	133	64.72	8607.66	Poor, foxy.
Isabella*	51.40	May 10	34	June 13	58.73	1999.00	July 24	69.43	104	Sept. 25	66.19	6884.00	138	64.37	8883.00	Good.
Rebecca	53.13	May 16	42	June 27	59.19	2486.00	July 24	69.43	96	Oct. 1	66.91	6414.66	138	64.49	8900.66	Best, (poor bearer.)
Y. Madeira	52.41	May 14	44	June 27	59.26	2607.66	Aug. 8	67.14	96	Oct. 1	66.91	6414.66	140	64.44	9022.33	Unfit for table.
Catawba	52.71	May 15	42	June 26	59.13	2483.66	Aug. 15	65.62	100	Oct. 4	66.65	6665.66	142	64.43	9149.33	Good, but unripe.
To Kalon	52.31	May 13	44	June 26	58.97	2594.66	Aug. 8	67.13	100	Oct. 4	66.65	6665.66	144	64.30	9260.33	Good, liable to rot.
Anna	52.71	May 15	43+	June 27	59.32	2551.00	Sept. 5	50.61	111+	.....	65.58	7280.+	154+	.....	9831.+	Unripe October 16.

* The Isabella, above observed, was in a sheltered position, and leafed and bloomed earlier than it would otherwise have done. In the open vineyard it appears to require the same initial heat as does the Catawba, and leafs and blooms on the same days.

The only anomaly apparent in the table respects the date of blooming and ming of the Isabella. The first by comparison with several warmer localiis antedated, perhaps, one week, and the date of maturity may safely be ed as quite two weeks too early. Dr. Underhill, of Croton Point vineas, on the Hudson, informs us that the Isabella blooms from the 14th to the of June, and though the fruit is gathered for market from the 14th to the of September, it continues to ripen for five or six weeks. At Kelley's nd, Lake Erie, another celebrated locality where the Isabella is successfully ivated and ripened, as we are informed by George C. Huntington, the bella and Catawba almost uniformly bloom on the 20th of June, and that first does not mature even under a higher heat than that known at Water- New York, until the 15th of October, and that they improve even until 15th of November.* Both Croton Point and Kelley's island are more orably situated for early blooming and ripening than is Waterloo, and yet he former the Isabella blooms and ripens later. The observed temperature ot, therefore, in this instance, a correct index to the wants of the Isabella, ause the vine observed was exposed to reflected heat, which raised its temature 10°, and assimilated its surroundings to those of more southern locali- . As an evidence of the value of shelter, this illustration is worthy of ark. The fruit is reported perfectly ripe under the observed temperature, ich could not have matured it without the increment derived from shelter.

Observations made on the vine at Brussels show that it pushed its first res at a mean date of April 25 for a series of years from 1841 to 1850, l that during this term the heat of the atmosphere in the shade was a mean 10.25° centigrade, or 50.45° Fahrenheit. This mean was preceded by a ı of temperature which may be esteemed uninfluential, that for March ing been almost as low as 6° centigrade, or 42.80° Fahrenheit.

The minimum temperature at which the vine commences foliation, according Count de Gasparin, is 9.5° centigrade, or 49.10° Fahrenheit. Boussingault nits that the 1st of April may be considered the point of departure for the comıcement of the growth of the vine in the department of the Lower Rhine, where experiments were made, and that in order to favor its growth this period uld have a mean temperature of 7.5° centigrade, or 45.50° Fahrenheit, acling to observations made at Strasburg. De Candolle believes that the imum temperature at the time of commencing vegetation in the spring may that of 8° centigrade, or 46.40° Fahrenheit. He, however, inclines to the ef that 10° centigrade, or 50° Fahrenheit may be considered the temature at which the vegetation of the vine properly commences, and such we l to be the case in our own experience with our native varieties. At this ə (April 24, 1864) the buds of the Concord vines are much swollen; some them have opened, and several other varieties are in various stages of enement, but without showing the leaf. The daily mean temperature for the t seven days has been 11.5° centigrade, or 53.76° Fahrenheit, and for the t two weeks 10.25° centigrade, or 50.42° Fahrenheit, and yesterday the ch blossoms expanded, and to-day the first bloom of the pear appeared

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At Kelley's island Isabella and Catawba leaf May 5 and 6, respectively, bloom June 20, ı October 15 and November 1, respectively. By known mean temperatures and aggres of heat calculated therefrom we learn that the Isabella requires 10,639 degrees, and the wba 11,307 degrees, Fahrenheit, from leafing to ripening. These are evidently the sums required in the open vineyard, and are proved to be perfectly in accordance with the of observation made at Croton Point and Poughkeepsie, New York, and at Haddon- , New Jersey.

nce the above was written, F. C. Brehm, of Waterloo, informs that he has destroyed ly every Isabella in his vineyard, as they do not succeed on his rich soil. He also informs the Diana ripens two weeks earlier than the generality of Isabellas, by which we may e of ripening of the Isabella in the open vineyard at Waterloo at October 4 and ., which is more in accordance with experiments elsewhere.

The mean temperature of the first week of April has been 6.3° 43.30° Fahrenheit; that of the second week of April, 8.3° centig e, or 40.9 Fahrenheit; and of the third week, 9.15° centigrade, or 48.49° numbers which agree very closely with those observed in France as demanded by the vine before and at the commencement of vegetation.

An examination of the table of leafing, blooming, and ripening of American vines, as observed at Waterloo, New York, favorably situated miles distant from Cayuga lake, exhibits the fact that the Diana and began the leafing process at the temperature of 51.40° to 51.66° F for ten to twelve days previous, or from the 1st of May, and that varieties opened their leaves under a mean of from 52.41° to 53.13°, from the same date. The leaves did not, however, expand until a da been experienced having a mean temperature of 60° or upwards; and has been our observation to-day, when the first leaves of the Clinton

De Candolle, in order to determine the possibility of vine culture a places, employs a table of aggregate temperatures derived from the dat the daily means of 8° and 10° centigrade above freezing first appear, re ively, until the day when the same mean heats are last experienced in This is based upon the assumption that the entire term is required for maturation of the various kinds of grapes that will grow and ripen in tude noted. Such has not been observed to be the fact in America. Se varieties of native vines ripen their fruit in August or early in Sep when the high summer means prevail, and this even near the northern li of grape culture, as we find by the foregoing table. Several mature fr middle to the last of September, while the temperature of this month at W loo, New York, for 1862, was 63.04°, being 13° above the mean at which ve tation commenced, and which mean was not reached until the middle of ber, when the first frost occurred.

By deducting the average temperature during the period from leafing to blooming from the mean temperature at and prior to leafing, we obtain the available heat necessary to advance the plant to the era of bloom. Taking the Delaware as an example, we find that it commences vegetating at about 52.41° Fahrenheit for 14 days previous, and blooms at a mean of 59.52° Fahrenheit, a difference of 7.11° for 45 days, (the time required,) giving us an average of 319.95° available degrees of heat, according to Fahrenheit's scale, necessary to conduct the Delaware vine to this condition. The average temperature from blooming to maturity is 68.17°, and the difference between this and the initial temperature of 52.41° is 15.76°, which continued for 77 days, the time required, gives us an aggregate from blooming to maturity of 1191.52° Fahrenheit. The latter sum, added to that required from leafing to blooming, 319.95°, exhibits a final aggregate of heat demanded by the Delaware above 52.41° of 1533°.47. This is equal to a mean of 12.57° above the initial for 122 days, the entire period required, or a mean temperature for the season of growth of 64.98°, or 65° nearly.

Waterloo, New York, appears to be very favorably situated for vine-growing, though near the northern border of successful cultivation. Its summer temperature being 66.05°, and the mean for the season from foliation to ripening of the earlier varieties 64.98°, and for those which require a longer season, and yet mature there, a mean of 64.37°. These means accord very closely with those determined as necessary in Europe for the growth and maturation of the hardier varieties of the wine grape; for, says Boussingault, "any country which has not a summer mean of at least 64.4° to 66.2° Fahrenheit, can have but indifferent vineyards." An indispensable requisite to perfect maturity is adequate heat during the later stages, and this is received at Waterloo in September, which enjoys a mean heat of 63° Fahrenheit. But the most important epoch in the life of the vine is that which follows the appear-

of the seeds, and at this period it is absolutely necessary that there should a month, the mean temperature of which does not fall below 66.2° Fah- it, a fact sufficiently demonstrated by the table of European localities, failure or success attend attempts to cultivate the wine grape at certain respectively, as set forth on page 480 of this volume. These results gain confirmed at Waterloo, New York, where, by examination of our on page 490, the natural product of calculations from the data in our ion, without effort to force an agreement, we find that the two varieties did not ripen at Waterloo were the Catawba and the Anna, whose h of stoning fell below 66.2° Fahrenheit, or to 65.62°, and 50.61°, or to at 62°, as shown by another calculation, respectively.

r judicious application of the principles deduced from the foregoing, the nt of a growing season may be readily, and, perhaps, accurately defined, all those varieties of grapes and other fruits whose demands for heat fall in the limits designated, other circumstances being favorable, be success- grown. Tables of aggregate temperatures might be constructed either on principle observed in the table of leafing, blooming, and ripening, or on noticed above as employed by De Candolle, which would serve as valuable es in practice.

ERAL RULES FOR DETERMINING THE FITNESS OF A DISTRICT IN THE UNITED STATES FOR THE GROWTH OF CERTAIN VARIETIES OF VINES.

he following rules derived from a close study of the requirements of the ous native grapes will be found very useful to many inquirers who are at to know the fitness of their district for their cultivation, and in connexion the following tables may serve instead of an isothermal and hyëtographic in map prepared to accompany a former article on the "Climatology of rican Vines," but not published.

Those places which have a summer temperature of 66.5°, a hot month)°, and a September of 60°, will ripen the Delaware, Clinton, Perkins, n, King, and some other very hardy varieties. The temperature of their ing season corresponds to a mean of 65° and upwards, and an aggregate eat of about 8,000° Fahrenheit. This district includes many parts of England and New York, northern Pennsylvania, northern Michigan, consin, and Iowa.

Those places which have a summer of 70°, a hot month of 72°, and a ember of 63°, will ripen the Concord, Hartford Prolific, Diana, Crevelling, Their season of growth corresponds to a mean of 67°, and an aggregate 500° and upwards. This district covers part of the southeast and south coast ew England, valleys of Hudson and Mohawk, neighborhood of the minor in western New York, southern border of Lake Ontario, southern Michi- southern Wisconsin, &c.

Those places which have a summer of 72°, a hot month of 73°, and a ember of 65°, will ripen the Isabella. Their growing season corresponds mean of 70°, and an aggregate of 10,000° of heat. They are not found e State of New York, except in the southeast extremity, lower valley of the son, and near some of the minor lakes, but appear on the southern border ake Erie, in northern Indiana and northern Illinois.

Those places which enjoy a summer mean of 73°, a hot month of 75°, a September of 65°, will ripen the Catawba. Their growing season sponds to a mean of 72°, and an aggregate of 11,000°. They are not l north of New York city and vicinity, or the southeastern counties of Penn- nia, middle New Jersey, or southern Ohio, Indiana, Illinois, and Missouri.

Those places which bask under a glowing summer of 74°, a hot month 5°, and a September of 75°, as at Los Angeles, in California, other cir- tances being favorable, may ripen the most tender European wine grapes rfection.

The exceptions to the above rules are found at places influenced b whose high or moderate September mean may extend into October wi tervening frost.

By consulting the following tables almost any one interested may d for himself what varieties of grapes he may grow on a small scale. not be wise to enter upon the culture without more minute informa larger study respecting the fitness of a locality for grape-growing places are too elevated that otherwise by position might be eligibl extensive tables of temperature accompanying the very valuable b reports of the Agricultural Department will assist some inquirers in det the mean temperature of their summer, their hot month, and of Se though not as reliable as the means for many years. These reports ha widely disseminated, and can or should be readily accessible in a county in the land. The material for the construction of the follo have been derived from Blodget's extensive list of temperatures "Climatology of the United States," and "Results of Meteorological C tions, 1854 to 1859," a report of the Commissioner of Patents, &c.:

Places which are beyond the limit of vine-growing; the normal tem required for ripening being, for summer, 66°.5; *for hottest month,* 70 *for September,* 60° *Fahrenheit.*

Locality.	Summer mean.	July mean.	August mean.	September mean.	Length of obser
	°	°	°	°	
Charlotte, Prince Edward's Island	66.1	70.5	67.7	59.5	One year.
Quebec, Canada	65.3	66.8	65.5	56.2	Ten years.
Fort Kent, Maine	61.7	62.5	63.5	51.6	Four years.
Eastport, Maine	60.5	62.3	62.4	57.3	Twenty-five years.
Castine, Maine	62.0	64.8	64.7	58.4	Forty years.
Bath, Maine	64.8	68.5	64.6	59.2	Ten and a half years
Dover, New Hampshire	66.9	70.1	66.7	58.8	Do.
Hanover, New Hampshire	62.8	64.4	62.3	55.0	Three years.
Craftsbury, Vermont	63.6	67.2	62.5	55.8	Six years.
Princeton, Massachusetts	65.8	70.3	64.9	58.6	Two years.
Williamstown, Massachusetts	65.3	68.3	63.4	58.5	Five years.
Pomfret, Connecticut	66.1	69.2	65.4	59.4	Six years.
Cherry Valley, New York	65.4	67.0	65.6	57.8	Fifteen years.
Cazenovia, New York	66.6	68.7	62.5	57.5	Two years.
Utica, New York	66.5	68.5	66.7	58.4	Twenty-three years.
Lowville, New York	63.7	67.8	62.1	56.8	Two and a half year
Potsdam, New York	66.3	68.4	66.7	57.4	Twenty-one years.
Penetanguishene, Canada	65.2	70.4	68.5	53.2	Two years.
Mackinac, Michigan	62.0	64.5	64.1	55.1	Twenty-four years.
Fort Brady, Michigan	62.0	64.9	62.9	54.6	Thirty-one years.
Fort Howard, Wisconsin	68.5	71.5	67.9	57.2	Four years.
Kenosha, Wisconsin	65.3	68.6	65.7	59.6	Three years.
Fort Ripley, Minnesota	64.9	67.3	64.7	56.7	Six years.
Sandy Lake, Minnesota	61.8	67.6	65.5	58.3	Two years.
Forest City, Minnesota	68.9	71.7	67.8	56.4	Do.
Fort Snelling, Minnesota	70.6	73.4	70.1	58.9	Thirty-five and a h
Stellacoom, Washington Territ'y	62.9	64.2	63.8	57.7	Five and two-thi
Astoria, Washington Territory	61.6	61.6	63.0	58.7	One and one

Places near the northern border of vine culture.

cality.	Summer mean.	July mean.	August mean.	September mean.	Length of observation.
	°	°	°	°	
ida East	70.8	73.1	70.8	60.6	Twenty-seven years.
	68.8	70.8	69.4	60.9	Eight years.
Hampshire	68.2	71.2	67.2	60.8	Five years.
ew Hampshire	70.2	74.7	68.6	60.9	Four years.
rmont	67.9	69.9	68.0	59.6	Twenty-one years.
achusetts	68.6	71.0	69.0	60.0	Fourteen years.
achusetts	68.4	71.9	68.7	61.0	Seventeen years.
ssachusetts	68.3	71.2	67.7	60.8	Six years.
ode Island	68.1	70.6	68.7	60.9	Twenty-three years.
York	67.2	69.8	68.2	59.4	Twenty-two years.
York	66.1	69.8	67.3	61.0	Four years.
r York	67.6	69.9	67.9	60.3	Twenty-four years.
w York	66.7	70.8	66.5	61.4	Five years.
an	67.6	69.7	67.5	60.0	Thirteen years.
isconsin	67.3	69.8	67.5	61.2	Eight years.
s	67.3	70.8	68.5	60.1	Five years.
, Wisconsin	68.5	71.3	68.3	60.2	Three years.
Falls, Minnesota	70.1	73.3	69.4	60.7	One year.
nesota	71.1	75.7	69.5	59.1	Three years.

hin the limit of vine culture, but not necessarily, from that cause alone,
l. If atmospheric humidity, &c., exist in a favorable degree success
more probable.

usetts	70.1	72.5	70.5	63.0	Forty-three years.
onnecticut	69.3	71.5	70.1	63.3	Eleven years.
w York	71.3	73.7	71.8	64.3	Thirty-one years.
ork	70.0	72.1	70.0	61.4	Twenty-eight years.
ork	68.8	72.9	66.4	62.2	One year.
w York	66.0	67.7	69.0	63.0	Do.
York	68.4	70.9	68.8	61.3	Eighteen years.
	69.9	72.4	69.0	63.4	Three years.
	70.2	72.7	69.1	64.2	Five years.
	69.9	73.2	72.1	62.3	One year.
	70.4	72.8	69.8	62.9	Four years.
igan	70.5	72.9	70.0	63.8	Do.
igan	71.6	74.7	71.2	63.8	Six years.
igan	69.4	73.5	68.2	62.2	Do.
sin	71.2	74.6	70.4	62.9	Do.
Wisconsin	72.3	75.2	72.0	61.5	Nineteen years.
	72.1	75.2	72.0	66.3	Two years.
r York	73.0	76.7	73.1	66.6	Four years.
ania	70.5	72.5	69.7	63.6	Five years.
	70.7	72.8	71.6	63.4	Do.
lvania	71.0	72.8	71.5	64.1	Four and three-fourths years.
rania	70.8	77.8	74.3	61.8	Two years.
ania	73.2	76.7	71.9	61.8	Six years.
	72.6	75.0	71.7	64.1	Five years.

Places within the limit of vine culture, &c.—Continued.

Locality.	Summer mean.	July mean.	August mean.	September mean.	Length of obser
	°	°	°	°	
Baltimore, Maryland	74.3	76.7	74.7	67.8	Twenty-four years.
Frederick, Maryland	74.5	77.7	73.1	66.2	Six years.
Sykesville, Maryland	71.6	73.8	70.5	65.3	Five years.
Washington, District of Columbia.	76.3	78.3	76.3	67.7	Thirteen years.
Berryville, Virginia	70.0	75.4	72.0	66.0	Two years.
Richmond, Virginia	75.4	77.6	74.8	67.1	Four years.
Lewisburg, Virginia	71.8	74.4	71.3	64.5	Six years.
Poplar Grove, Virginia	73.0	75.7	72.7	66.1	Four years.
Kanawha, Virginia	74.2	77.2	73.6	66.1	Two and a half years
Marietta, Ohio	72.9	76.2	73.1	69.9	One year.
Portsmouth, Ohio	75.1	78.3	73.7	66.1	Do.
Cincinnati, Ohio	75.8	79.8	76.3	69.2	Five years.
Cincinnati, Ohio	74.0	76.5	74.2	66.0	Twenty years.
Richmond, Indiana	72.4	74.7	72.5	66.1	Five years.
Peoria, Illinois	74.6	75.6	74.2	69.9	Four years.
Carthage, Illinois	74.9	79.1	75.5	67.8	One year.
St. Louis, Missouri	76.3	78.5	76.5	68.7	Twenty-three years.
Manhattan, Kansas	74.9	76.1	78.6	73.2	One year.

The following will, we hope, clearly illustrate our mode of ap foregoing principles to practical vine-growing.

By examination of tables of daily mean temperatures before us, we at Providence, Rhode Island, a temperature of 52.50° had ex of May to the 13th, and that on the 8th of September an aggre had accrued equal to 7,915.7°. This, according to results at W York, is about adequate to the ripening of the Delaware and the Han lific, which commence leafing at a temperature of 52.41°, and require 7, of heat. The time required to accumulate the above amount of 1 days, being four days less than at Waterloo. The average tem the entire period was 66.23°, and for the month of stoning 68.5° which are amply sufficient for the requirements of these varieties. therefore, be grown with good success at Providence, Rhode Isl cumstances concurring to favor the attempt.

If the Diana leafed at Providence May 12 at the temperature of as required at Waterloo, and an aggregate of heat of 8,572.66° was this variety also may be grown. For the sum reached at Provid tember 17, 129 days from date of appearance of the needed initial or was 8,588°, with an average of 66.57°, both of which exceed the the Diana.

The Clinton requires about the same temperature as the Dia lower degree than most other varieties, and consequently earlier. temperature is 51.66°, which was reached on May 12, 1854, at Pro The Clinton will ripen for wine with a low measure of heat, 8,213°, w accumulated on the 11th of September, when 8,223.5° had accrued in having an average temperature of 66.85°. At Providence, Rhode I Clinton may, therefore, be successfully grown.

The Concord expands its leaf at an average temperature of 17 was attained up to the 14th of May, 1854, at Providence. It r

a 8,607.66°, which accrued by the 21st of September, or thereabouts, 3,581.3° were found to have been reached by addition of the daily means days, at an average of 66.51° for the entire term. Even with this ag- it was reported at Waterloo "poor and foxy." The Concord may e readily grown at Providence, Rhode Island.

ecca, leafing at 53.13° on 14th May, required 8,900.66° to advance it urity. On the 26th of September the sum of 8,906.9° was attained at ence in 135 days from date of foliation. If the Rebecca was fully l at Waterloo, it might be equally well grown at Providence on a warm d under a favorable aspect.

e suppose the Isabella to bloom at Providence on the 15th of May, he initial for the Catawba, 52.71°, has been reached, which is highly le, from comparison of observations at Kelley's island and elsewhere, at it may mature as early as the 15th of October, which is later than te of the average appearance of frost, and yet not an erroneous assump- e find that between these dates a sum of heat will have accumulated of °. From this we learn that in favorable years when the autumn is warm e frosts very late that the Isabella may be grown, but that its ripening n general be uncertain and irregular.

Catawba and Anna open their leaves at the same temperature as the are, or thereabouts—52.71°—but require more than 11,000° Fahrenheit n them—a sum of heat which is not reached at Providence before the ance of frost, except in very favorable years. As the temperature de- rapidly after the middle of October, and killing frosts occur near the ing of the month, not unfrequently, in the average of twenty-eight on the 11th of October, the latter-named varieties cannot in general be ly ripened at Providence.

n the preceding application of the principles derived from the table and rison of observations made elsewhere from similar data, on which our forbid further enlargement, we conclude that the Delaware and Clinton artford Prolific may certainly, and the Concord, Diana, and Rebecca enerally be grown at Providence, Rhode Island; that Isabella cannot be perfectly ripened; and that the Catawba and Anna can never be natured, unless in the long warm autumn of extremely favorable years.

general conclusions are, that the Delaware, Hartford Prolific, and Clin- ong to a class of grape-vines which requires for ripening about 8,000° ; that Concord and Diana demand 8,500°; Rebecca needs about 9,000°; a 10,000°; and Catawba and Anna must be grown where they shall from foliation to maturity a sum of heat calculated from the daily mean atures which must at least amount to 11,000° of Fahrenheit's scale. unately extensive tabulated reductions of daily mean temperatures are ready access. Those made by Professor Caswell at Providence, Rhode , we have been enabled to consult while preparing this paper, but much that we have not been able to obtain similar valuable data for sundry over a wide district. The records we have been enabled to consult have, er, been ample for our general purpose—to establish the principle that employ the elements of initial temperatures and duration of heat—com- e values of temperature and time, for the determination of the possibili- culture in any district, of plants as yet there unknown or untried.

omparing the table of American grapes exhibiting their dates of leafing, ith that in which we have noted the temperature of various places in s within and without the wine districts, we observe many points of simi- between our native vines and their foreign congeners. By the table of wine localities we learn that at all those places where the mean for the nth falls below 67°, the wine is not good or the fruit never ripens,

and that those enjoying a mean for the hottest month above 67° perior fruit and wines. This is precisely paralleled in our table of A varieties grown at Waterloo, New York, where we have observed which could hasten their growth so that they could take advantag mean of 69°, during the month following the stoning process, w of superior quality; those which stoned so late as to have only 67°, abouts, were inferior, and that those which found a tempera thereabouts, did not ripen.

The short warm summer of northern latitudes with its longer days the vine as rapidly as the high temperature in places further diminished heat of September precludes the proper elaboration and maturation of the seed and saccharine in the late-growing examination of the table in which is instituted a comparison b temperatures for the growing seasons at West Point, in the valley o son, and several points in the valley of the Mississippi, we may while at the former place the mean temperature for September falls a mean nowhere exceeded in the State of New York from 1850, as shown by the "Reports, &c.," except at Buffalo, w eight-hundredths of a degree higher, while the mean for all the in the State was 59.87°—our table shows that at Fort Madison, mean for September stood at 71.5°; at Athens, Illinois, 73°; and at 68.7°; while the mean of the hottest month varied between 73° heats adequate to mature, with the favorable high temperatures of vines of the most "southern proclivities," or such as require the and the warmest skies.

Here a comparison between this part of the valley of the M south of France, the vine regions of Portugal, Spain, Italy, and show that the temperature of the warmest month in the Missi identical with that of the latter-named places, so famous for their and generous wines, while the autumn months are equally propi Concord, the Catawba, and Anna, which find the cold of Septem New York unfavorable to their ripening, when removed to the warm Illinois and Missouri, under their high and long-continued heats, qualities so surpassing those they exhibit in the northeastern States, scarcely recognized as the product of the same varieties, respectively, the latter localities.

Those who have attentively perused the foregoing attempt to de amount of heat needed by the American wine grape during its v of growth will, we doubt not, perceive therein strong proof of the imp close attention to the demands of each variety when selecting for various localities, and will regard with interest the meteorological of their place of habitation. To all such we would say that we if they would add to the knowledge of the mean temperatures of yard, the general fact of adequate atmospheric humidity—for in the p of meteorological knowledge we cannot determine for each pl , by deductions from instrumental observations yet made and tabula rules for its determination—and will be guided by the instruc taining the isotherms bounding the regions of successful grape cul United States east of the Mississippi, as enunciated in the partment report for 1862, all which our recent research, as d paper, but confirm, they will not have reason to doubt the wo or tions and their practical value.*

*A typographical error of much importance occurs in the article here referred this occasion offers the only opportunity for correcting. On page 195, first line, " should read Armenia.

NOTES ON THE WHEAT PLANT, ITS RANGE, ETC.

the plants which the earth produces spontaneously appear to be
ange within certain districts, and few of them would survive a wide
rcumstances, creative Providence has, nevertheless, endowed many
st essential to man with a greater flexibility of structure, so that
their production may be extended by culture beyond what have,
tances, been assigned to them by nature. The grasses that yield
specially favored in this respect, their culture having been much
rough the knowledge and industry of man. The *Cerealia* also
rkable examples of very numerous varieties derived from one
Ceylon alone there are one hundred and sixty varieties of rice;
or millet, very many kinds; and of *Triticum*, or wheat, we have a
ined species, which have been increased until, by different modes of
and the influence of soils and climate, more than two hundred
ve been produced. From the well-defined species accepted by
d which may be described in general terms as the hard wheats
ats, and the Polish wheats, all the innumerable varieties known to
s have descended. The hard wheats are the product of warm cli-
as Italy, Sicily, and Barbary. The soft wheats are grown in the
rts of Europe, as in England, Belgium, Denmark, and Sweden.
wheats grow in the country from which they derive their name, and
l wheats. The hard wheats contain much more gluten than the
ies. This valuable ingredient is a tough, viscid substance, very
nd which, as it abounds in nitrogen, readily promotes fermentation
, and is essential to good light bread. The quantity of nitrogen
the soil and climate from five per cent. in some soft wheats to
nt. in the hardest and most transparent. It is the higher propor-
n that exists in Italian wheats that fits them for use in the prepa-
caroni and the rich pastes that form so large a portion of the food of
that land. The softer wheats contain a larger proportion of starch.
are usually grown in England, and require to be well dried and
fore they can be readily ground into flour.

said that many of these varieties of wheat have resulted from influ-
d from the soil. Some soils are remarkable, far and wide, for
od seed, and it is equally well known that this seed degenerates in
o that the original is resorted to for fresh supplies of seed. This is
vn in England that the produce of a certain parish in Cambridge-
l for seed at a price considerably above the average. It is not,
experience of all that the finest wheat makes the best seed, but in
seed the nature of the soil upon which it is to be sown must be
s well as that upon which it grew.

n asserted that all the various noted seed-wheats, when analyzed
ist, are found to contain the different elements of which they are
nearly the same proportion, especially the starch and gluten. For
which contains the most gluten is preferred; but to produce a per-
on there should be no excess of this substance, and no deficiency,
l should have arrived at perfect maturity. Moreover, it has also
and with great apparent probability of its truth, that if we wish to
culiar sort of wheat, and find by our preparation of the soil or its
position that we produce a wheat in which the gluten and starch
nt proportions from that of the original seed, we may conclude that
to more or less nitrogenous matter in the soil—that is, more animal
proportionally more vegetable humus; and by increasing the one
we may bring our wheat to have all the properties of the original
electing seed from those ears which appeared superior to the others

in a field of ripe wheat, sowing them in a garden or in a part of the field, t
variety which may have been produced by some fortuitous impregn
some peculiarity of the soil of the spot where it grew, may be perp
carefully adapting the seed to the soil, and by a careful and ga
vation, and adding those manures which are found to be best ada
its perfect vegetation, crops of wheat have been raised which at one
have been thought miraculous, and in Great Britain, where only is ma
regarded as its importance demands, and the highest skill, the re
ened inquiry into the requirements of this invaluable grain, been
applied, the average product has been greatly increased on all soils.

To original defect in the soil or inadequate fertilization we may
ascribe the deterioration observed to follow cultivation of varieties
which at first appeared well adapted to the locality and to the c
demand for new seed-wheat to repair the loss arising from con
the product from year to year, should induce cultivators to seek for a
this deterioration, either in the condition of the soil and its constituents, or
unwise culture and indifference to the selection of the best product for
the crop. We have many recorded instances of the very valuable res
care in selecting the largest and heaviest grains for seed. In s
the crop has been quadrupled in quantity and quality by the use of
seed selected from that with which the rest of the field was sown.

When importing seed-wheat and any other seed of new or superior v
of plants, attention should always be directed to the peculiarities of the
climate under which they originated, and those under which it is prop
grow them. English varieties of spring wheat are sown in February
in March, have the benefit of early spring growth, and of a milder and
summer than a spring-sown wheat can have in the eastern United State
failure that has attended recent attempts to introduce English vari
is no new thing, such having been the almost universal result for m
past.

The distinction between winter and spring wheat is one which arises
from the season in which they have usually been sown, for they can re
converted into each other by sowing earlier or later, and gradually acc
or retarding their growths. If a winter variety is caused to germinate
and then checked by exposure to a low temperature, or freezing, until
sown in spring, it may be converted into a spring wheat.

The difference in color between red and white wheats is owing chief
influence of the soil, white wheats gradually becoming darker and ul
red in some stiff, wet soils, and red wheats losing their color and becon
yellow and then white in rich, light, and mellow soils. The grain
color sooner than the chaff and straw, hence we have red wheats wi
chaff, and white wheats with red chaff. The bl[illegible] stem, long [illegible]
Virginia, was formerly a red, but is now a be[illegible]
Harmon, in the Patent Office Report for 184[illegible]

If it be true that each variety of grain is ad[illegible] to a specific climate
it grows perfectly, and where it does not degenerate when supplied wit
and sufficient nourishment, may not the consideration of the origin
variety we propose to sow be of more importance than has yet been
to it in the selection of minor varieties, the product of our own country
varieties of wheat that have originated, apparently by accident, (for
no accidents in nature,) or from peculiar culture, do not enjoy all the s
ings necessary for perfect continuous product. Causes yet unexpla
ever at work modifying the germ of the new growth, and the guardian
man is needed to preserve unimpaired, or to perfect the already improv
In most soils, we are aware that wheat degenerates rapidly if the seed
year after year where it was produced. Nor is it sufficient to prevent

that the seed be taken from a different field, but that grown on a soil of
erent quality is to be preferred, and if from a different climate, but not widely
erse, it is found that the product is increased in quality and in quantity.
English-grown seed when sown in Ireland generally comes to maturity ten
ys or two weeks earlier than the native grown seed. In general, plants
ated from seed produced on a warm, sandy soil will grow rapidly in what-
soil the seed is sown, and plants from seed produced in a stiff, cold soil are
in growing, even in a warmer soil. On limestone soils, which are often
y, wheat-seed, the product of sandstone regions, generally succeeds best.
experience of a Kentucky farmer shows that seed-wheat obtained from a
thern locality has failed with him, owing to late ripening and consequent
ury from rust. The experiment was tried with three varieties of northern-
wn seed, and with the same result in each case. When wheat from a
thern locality was sown by the same experimenter, his crop ripened early,
free from rust and disease, and improved in sample over the original; while
main crop, in the same district, was ruined by rust and other diseases.
his experience was corroborated by the result of four seasons of growth; and
southern-grown seed, because of its early ripening, is rapidly superseding
the later wheats in the district referred to. The kind of wheat introduced
om the more southern region of Tennessee, or, perhaps, northern Alabama,
the "Early May," which, though small, possesses superior flouring qualities,
d is now the ordinary wheat of some northern counties of Kentucky, where
does not deteriorate, but improves in quality. The controversy that was
iginated by the introduction of the Tennessee "Early May" wheat into north-
localities appears to have settled into the belief that the selection of southern-
own, early-ripening varieties is judicious where it is necessary that the grain
uld attain early maturity. To escape the rust so destructive in the lower
ley of the Ohio and Mississippi, and the midge, that ravager of the late
ripening wheats in western New York and New England, early ripening sorts
have been successfully introduced, none, it appears, with better promise of use-
fulness than the "Early May," wherever the soil is sufficiently protected by
snow during the winter in more northern districts. The experience of judicious
farmers in Ohio, Pennsylvania, New York, and New Hampshire, testifies to the
early ripening properties and valuable milling qualities of this variety, of which
may be found ample proof in the pages of that excellent agricultural journal,
"The Country Gentleman," vols. XIV to XXII.

The "Mediterranean" is an early ripening southern wheat, which it is said
was introduced in 1819 from Genoa, Italy, by John Gordon, of Wilmington,
Delaware. It is still an early ripening and very valuable wheat, adapted to
many districts where the more tender varieties subject to the attacks of the
Hessian fly, midge, or the rust, have rendered resort to this kind necessary.
The introduction of the Mediterranean has proved an invaluable boon to many
districts. Many other valuable kinds, noted for early maturity, &c., are of
southern origin. The Rochester, or original White Flint, is said to have been
of Spanish origin. The Turkish White Flint is not affected by fly, rust, or
midge. The China or China Velvet wheat ripens at the same early date as
does the "Mediterranean;" as also does the Malta, or White Smooth Mediter-
ranean. The "Early Japan" wheat, from seed brought by Commodore Perry,
is o from a warmer region than our own, and ripens early. So valuable has
s variety been deemed by one grower, that he asserts that had Commodore
y brought many bushels, it would ere this have paid the expenses of the
pedition from the increased productiveness through early ripening and adapta-
to the wants of the country.

All attempts to ripen wheat early by sending further north for seed have
lly failed, says a Kentucky farmer. The experiment of sowing Canada-
own wheat in Pennsylvania resulted in a ripening of the crop two weeks

later than that grown from native seed. As the cereals, which, as w
said, possess great flexibility, and are readily subject to the influ
and climate, we might naturally expect to find that wheat grown
time in southern Tennessee or northern Alabama, where the mean
of March equals, if it does not surpass, that of April in north
and southern Ohio, would acquire a tendency to early vegetation,
would retain when removed to more northern localities, and the p
enabled by early maturity to escape the high heats of early
insect enemies which appear at the period of the late ripening of
grown wheats. Though it may be advisable to use southern-grown
seed, the rule, we fear, will not apply if such seed has grown more
or three degrees further south. All northern planters who have expe
with southern-grown seed-maize have learned that they cannot ripen
if the seed has been brought from a few degrees of lower latitude.
from the sudden decline of the temperature of September and Octol
early access of killing frosts, which shorten the period of growth to w
large and rank-growing southern kinds of corn have been accustomed
the summer heats may have been the same as they had known in
place. In the case of the southern wheats removed to a northern
variety is not more rank or strong-growing, does not appear to require a
season, but has had impressed upon it a proclivity to early vegetati
influence of the early heats of March and April, which are not known
north until April and May, respectively.

The first successful attempts to grow wheat in the West India isla
more recent times, appears to have been made in 1835, in Jamaica and
Providence. The varieties used in these experiments were the Victo
which had been grown for two centuries by the Spanish farmers of C
and an English white wheat, and an English red wheat, also the
wheat of English growth. In these experiments perfect success atten
use of the Caraccas wheat when sown either in Jamaica, at a height o
to 4,000 feet above the sea, or at New Providence, but just removed
ocean level. This is ascribed to the long acclimation of this variety to
heats of a tropical winter which may be taken at nearly 70° Fahrenl
in the elevated regions of Jamaica and at New Providence in t
tricts. But while the productiveness of the Caraccas wheat was
its approach to a lower level, the English seed-wheat sown
failure. Even the English-grown Caraccas was highly productive in
Providence, though the varieties, long inured to the cool, humid cl
Britain, scarcely produced stems, and in one instance spread into a tuft
sing to form straw or head under the new aspect of affairs. Thus we
that the wheats transferred from a colder to a warmer region did not s
and that the Caraccas wheat grown one season in Britain had not
peculiarities by the voyage, but was nearly, if not quite, equal in p
its native but untravelled brother, the original Victoria of
Surely there existed in the latter variety some inherent virtue wh
dull skies of England could not destroy.

THE PRODUCTION OF NEW VARIETIES OF WHEAT.

The production of new varieties of wheat either by careful selection of su
perior kinds, the spontaneous growth of nature, or by judiciously crossing
varieties which possess properties it is desirable should be combined and per-
petuated, offers a fitting field for the exercise of the skill of those vegetable
physiologists who would advance the welfare of a nation by devoting them-
selves practically to the increased production of this staff of life. The extra-
ordinary improvements effected in our esculent vegetables and fruits of almost

ery kind are known to all, and it may be just cause for surprise that the
t important growth of temperate climates, the cereals, or wheat, rye, barley,
s, maize, and the grasses generally, should have shared to but a limited
it in these improvements.

nat cross-fecundation and hybridization are possible has been fully proved
the results of experiments made by Maund and Raynbird, whose "Hybrid
réalia" received the prize medals at the industrial exhibition in London in
51; and that success has attended judicious efforts to improve upon the
dinary wheat by continued careful selection of seed, is evident from the
oduct of the "Giant wheat" and "Pedigree wheat," grown by F. F. Hallett,
Brighton, England. By selecting from year to year not only the best heads
wheat, but the best kernels of the finest ears, and using them for seed, this
ntleman has produced a variety possessing great fecundity of grain, extraor-
nary strength of stem, and uniformity in the size of the ear. Some of the
ds of these new varieties measured seven inches in length, and were pro-
ionably thick. In some instances one kernel has produced seventy-two
ls, containing six thousand four hundred and eighty grains, and a maxi-
um product was obtained of sixty and sixty-two, and in one instance seventy-
bushels per acre. The highest results on the farm of Mr. Hallett were
x quarters or fifty-six bushels per acre, which appears to have been produced,
ot upon a chosen garden spot, but upon several acres. The large numbers
med above need not excite surprise or doubt of their probability, since Schuyler
unty, Illinois, has produced wheat heads six and a half inches long, and
albot county, Maryland, has exhibited a field of nearly thirty acres which in
360 yielded very nearly fifty-five bushels of wheat of sixty pounds, each, to
ie acre, and nine of which produced sixty-four and a half bushels upon each
re. This last was a smooth-headed wheat brought from North Carolina a
w years before. William Hotchkiss, of Niagara county, New York, exhib-
ed, at the industrial exhibition in London in 1851, the product of six acres in
849–'50 which averaged sixty-three and a half bushels to the acre, weighing
xty-three pounds to the bushel. This extraordinary yield was, however,
xceeded in the summer of 1853 by Thomas Powell, of the same county,
ose field of seven measured acres averaged within a small fraction of seventy
ushels to the acre—namely, four hundred and eighty-nine bushels of wheat.—
See the report of Heman Powers, of Lewiston, New York, in the Patent Office
eport, agricultural division, for 1853.)

Mr. Hallett describes the system by which he produced his "Pedigree wheat"
s follows:

"The best plant is called 'the selection' of the year (say 1861) in which it is thus obtained,
nd consists of numerous ears containing many hundreds, and even thousands, of grains,
hich are planted separately, those of each *ear* being kept quite distinct, as, although the
est grain of any plant is nearly always found to lie in its best ear, it may be otherwise, and
successive parent *ears* must be preserved. At the following harvest (1862) the best plant
ams 'the selection of 1862,' and its produce is continued on the experimental ground, while
hat of the remaining plants furnishes the annual seed for the farm in the autumn of 1862, and
he crops are in 1863 offered to the public. Thus the selection sold is that of 1861, or in any
ear that of two years before: the latest selection, that of the year immediately preceding, is
ot sold, being solely employed as the home seed."

The extraordinary improvement induced by Mr. Hallett it is not to be ex-
cted would continue to be maintained for many seasons under ordinary field
atment. It is also charged against his wheat that in so far as he has been
cessful, it has been in fixing the excessive coarseness which their seeding
s to produce, and that his system has not only failed to improve, but has
duced great deterioration. This is the opinion of a practical writer and
er who may have over-estimated this deterioration, as we observe an im-
ved wheat highly lauded and a competitor for public favor which bears the
of the practical farmer above referred to. That there is, however, ground

for the belief that the improvement in the quality of the "Pedigree wh
not kept pace with size and productiveness. we have testimony in a c
of sundry new wheats reported in the "Gardener's Chronicle," and
in "the Pennsylvania Farmer and Gardener" for June 1864. wh e
made from "Hallett's Pedigree wheat" is described as "of i
scription." The error of this improver thus appears to have been
disregarded quality in the pursuit of extraordinary size and pr
That all these merits are compatible may yet be shown in the pr
other experimenters who shall properly regard them in combin
as it may. it is quite probable that Mr. Hallet's system may fur
hints to those engaged in growing seeds for market. and incite
attention to the importance of securing clean and perfect seed.

A new variety of wheat introduced into a district has in s
proved of very great value. It is said that the product of one
variety brought from North Carolina in 1845. had in nine years
farmers of Preble county, Ohio. alone. more than $100.000 by the
what would have accrued from the continued use of the old vari
few heads uninjured by rust or midge. found in the midst of a nea
injured by both maladies. a careful and observant farmer grew the f
bert wheat. This variety ripens even earlier than the Mediterran
into the composition of its chaff a larger proportion of silicious
to enter. it probably for that reason escapes the attacks of the midge.
perior variety of spring wheat. known as the China or black-tea wh
nated from a few kernels found in a chest of black tea. Hunter's
of the oldest and most esteemed varieties in Scotland. was discovere
century ago by the roadside in Berwickshire. Through long culture
of care this variety has greatly deteriorated. The Fenton wheat, a ve
able variety, which yields heavily on very strong soil, such as that on
originated. was derived from a few ears found growing among the ru
rived from a quarry of basaltic rock. Piper's thick-set. a wheat whic
largely on meadow soils, having produced sixty bushels to the acre, l
ficient in straw product, was derived from a remarkable ear found in
field and its product carefully cultivated.

The above-cited examples clearly indicate the importance of carefu
vation and the judicious selection of material for the production of i
proved kinds. The varieties thus obtained are, however, very apt
or use, and can only be kept pure by continued care in selection. The
wheat crop of England has been estimated at thirty-six bushels per
the United States the average may be placed at or below fifteen bu
acre. Many English farmers annually raise fifty bushels per acr
large product is the result of judicious cultivation and care in the ch
rather than of the influence of climate. for the same success
wheat-growing in America where every attendant circumstan
regarded and the demands of the wheat-plant fully supplied

The principal climatological source of injury to whea
treme humid tropical heats to which the warmer temper zone, be
Mississippi valley and on the Atlantic slope, is liable, whereby are c
rust. mildew, &c. During the colder months wheat may be grown w
tropics but little removed above the level of the sea, but where the hu
intrude into the cooler zone, as along the Atlantic coast as high as
and over much of the interior plain of the Mississippi, below the Oh
cannot be successfully grown.

In the months of May and June, 1858, at Marietta, Ohio, south,
and southeast winds prevailed. During May there fell twelve an
inches of rain, with maximum heats of 84° and 99° for the respective

ay twenty-four cloudy days were observed, and in June ten days of
y. This excess of rain was not confined to Ohio, but was felt in all
rn States. The consequences of this excess of moisture, obscured
igh heats, were the general destruction of the crops of wheat and
blight or rust on the wheat and a mould on the oats. The last expe-
otal failure in three-fourths of all the fields in the valley of the Ohio,
that escaped were on high ground or had been sowed early. Many
heat were not reaped, but were left to decay, and were ploughed un-
benefit of the succeeding crop.*

he study of many facts connected with the growth of wheat in tem-
l tropical climates, we are led to believe that in the United States the
ive limit to its cultivation on the south is the northern bounds of hu-
al heats, while on the north it may be grown to the utmost northern
of Maine, latitude 47° 30′, where the mean temperature for May,
July is but 56.11°, and that for the warmest month, July, 62.30°
t. The northern boundaries of the United States are, however, by
the northern limit of its culture. Wheat is grown on the Saskatche-
, in the territories of the Hudson Bay Company, near Lake Win-
atitude 54° north, where the months of May, June, and July have a
perature of 57.11°, and July enjoys a mean of 61.8°.

plains of Bogota, where the temperature rarely exceeds 59°, wheat
in 147 days, having been sown in February and harvested the last
uly, the mean temperature for the entire period having been 58° and
Quinchuqui the vegetation of wheat begins in February and ends in
mean temperature of between 57° and 58° Fahrenheit. In England
ier of 1853 was in many places at too low a temperature to ripen
l the deficiency was general, and said to have been from one-third to
f the usual product. The mean for the months of July and August
and 59°, respectively, or two degrees below the usual average. From
comparison of data it appears that wheat cannot be successfully
iere the warmest month of its growth, or that wherein the grain is
falls below 60°, or the mean of its period of growth below 56°.

thor of a paper on the "Effect of Temperature on Cultivation," read
ng of the London Central Farmers' Club, a resumé of which appears
Country Gentleman" for June 11, 1863, states that in England the
uired, in 1860, 145 days from the first growth to maturity, March 28
to 20, of which 133 days were actual growing days, having a mean
re above 42°. In 1861, 130 days were required, during which period
below 42° occurred, this being, in his opinion, the minimum at which
ation of wheat will continue active. The experiments of this writer,
through several years, result in the opinion that when the tempera-
soil, during the period included between the time of earing and ma-
ls below 58° to 60° no progress can be made, and unless 60° is ex-
crop never fairly ripens.

ove appear to accord closely with the requirements of the wheat-
he United States. Those places where the mean for May generally
r 58° and 60° are the New England States and New York, except a
s in the valley of the Hudson and in the southeastern extremity of
, most of Pennsylvania and New Jersey, except the southern parts,
nnesota, Wisconsin, Iowa, Michigan, northern Illinois, northern In-
thern Ohio, and in all these districts the wheat crop cannot mature
The June mean for most of the districts named is, with few excep-
as Washington county, Maine, which is in the extreme eastern part
exposed to fogs, also some sections of Vermont, Minnesota, and

* Silliman's Journal of Science, N. S., vol. XXVII. pp. 216–217.

Wisconsin, is above 61°, and the process of heading, which in lower and w districts takes place early in May, throughout the northern sectio o United States probably occurs late in May or early in June, and the harvested from the middle of July to the first of August.

Those places in the northern States which do not enjoy a temperature in June have this mean in July, and can therefore grow spring wheat, sown from the 10th of April to the 10th of May, and is sufficiently adva receive the benefit of the mean of 61°, which is sometimes barely reached in only, that for August often falling below it, and the wheat is harvested 10th to the 20th of September. In Aroostook county, in the extreme of Maine, the mean for July and August are about three degrees hi Washington county, at the eastern extreme of the same State, at ponus observations have been made, and the wheat is sown in the middle of May harvested from the last of August to the 1st of September.

In the southern counties of New Jersey, Pennsylvania, Ohio, Ind Illinois, Missouri, and Kansas the mean of 61° is reached in May, and not grown in elevated regions the wheat is ready for the reaper s June, and generally not later than the 10th of July. In districts furu where not retarded by elevation above the general level, the harv oc June, and in Cabarras county, North Carolina, the "Early May w ripened in the month from which it takes its name. and in Montgo r c Alabama, near the southern limit of wheat-growing east of the M ripens about the end of May.

The following observations on the amount of heat required by plant in different countries and under different degrees of cloudin of interest in this connexion.

Under the comparatively clear sky of Germany, at Arnstadt, experi show that wheat requires from flowering to maturity 53 days, having a temperature of 63°, making an aggregate of 3,339° Fahrenheit.

In the neighborhood of Richmond, Virginia, the "Japan wheat" headed 30th of April, 1860, and was reaped 14th of June, 1860, a period of forty-six days. During the thirty-one days of May the mean temperature was 66.3°, an aggregate of 2,056°.23; for the fourteen days of June, 73.56°, an aggregate of 1,029°.84; from which we learn that from heading to maturity 3,086.07° are required at Richmond, Virginia, when the early variety, known as the "Japan wheat," is sown.

At Haddonfield, New Jersey, early-sown "Mediterranean" wheat headed on the 18th of May, 1864. For seventeen days the temperature had been at a mean of 64.30°. From the 18th to the 31st of May, inclusive, a mean daily temperature of 67.66° was observed, making an aggregate of 947°.27. The thirty days of June enjoyed the high mean temperature of 69°.229, which formed an aggregate of heat of 2,076.89°. The wheat was cut on the 30th of June, in forty-four days from heading, and required an aggregate of heat derived from daily mean temperatures, as observed by a thermometer in the shade, of 3,024.16°, having been hastened to maturity by the almost cloudless skies from the 10th to the 30th of June, combined with intense heats of the last week, and long-continued drought.

In Monroe county, New York, the wheat headed on the 10th of May, 1859, and was reaped on the 8th of July. To ascertain the amount of heat required from heading to maturity, we observe that for the twenty days of May, which enjoyed a mean temperature of 57.17°, there results 1,143.40°; for the thirty days in June, with a mean temperature of 64.72°, an aggregate of 1,941.60°; and for the seven days in July, with a mean temperature of 68°.21, results 477.47°, which combined, forms a final aggregate for fifty-six days from heading to maturity of 3,562.47°.

The above resulting aggregates of heat, derived from the very meagre data extensive research has brought to light, do not entirely agree with the ount which appears to be required for maturing the crop in Britain. For stern New York, where the climate is more moist and cooler than that of w Jersey or Virginia, the aggregate accords very well; but, in the dry disets of the south, the early varieties of "Japan wheat" and "Mediterranean" to demand smaller aggregates of heat, as we would reasonably expect y would require from their quality of early ripening.

In England the periods of growth varied from sixty-nine days in 1860, when, or ten days, the thermometer did not rise above 58° Fahrenheit, and fifty-nine ys were thus required at an average daily mean of 61½° and an aggregate 3,629° were received, to fifty days in 1861, when an average was noted of .8°, and an aggregate of 3,225° were required to ripen the grain. Again, in fifty-six days, at a mean of 61°, and an aggregate 3,406°, were required to oduce the same result. As the wheat in England did not head until the 12th June, and this process commences here from the 1st to the middle of May, later, the time as observed in Monroe county, New York, though it nearly orresponds to that of Britain, ripens the crop about one month earlier. The lifferences observed in the above results may be ascribed to different degrees of cloudiness, which, while it affects the direct heat of the sun, cannot be indicated by the thermometer with precision.

The foregoing observations indicate that, during the period that the wheat plant is passing from the bloom to the ripe fruit, the temperature must be above 50°, or that spring and winter wheat should be sown at such a time that they can take advantage of this mean for the heading process, which commences in the rthern States generally about fifty to fifty-five days before maturity.

To the English wheat-grower the most important researches of the English experimenter are those which respect the temperature of the soil at the time of wing in autumn. As the temperature of the soil does not differ perceptibly rom that of the mean temperature of the air for a series of days, observations on the soil may be dispensed with. The results of our own experiments indicate that such is the case for short terms. The observer considers it unsafe to sow autumn wheat until the temperature of the earth has been reduced to 50°, a mean temperature which is seldom reached in the United States in latitude 40° north until the second or third week of October, or until a frost has occurred. His reasons for the opinion are founded on the experience that the best crops of wheat have been grown from seed that remained in the ground upwards of thirty days, which term was required in order to enable the seed to root properly before sprouting luxuriantly, and employing its strength in forming leaves at expense of the roots. The foregoing observations on the proper time for wing wheat, we apprehend, are not immediately applicable to our climate, but we have presented them in the hope that they may induce corresponding observations on our own soil and crops, which possibly may enable us to select the proper time for committing the seed to the ground with the best promise of success.

THE RANGE OF THE WHEAT PLANT.

Meyen, in his Geography of Plants, asserts that wheat requires a mean nal heat of 39° Fahrenheit, a summer heat of 56° Fahrenheit, and that inferior mean heats suffice in the extreme climates of sub-arctic America, vided the summer heat of one hundred to one hundred and twenty days be ough.

At Sitka, in Russian North America, latitude 57°, the mean of 39.7° for the year has been observed, and a summer mean of 51.5°, yet wheat will not ripen,

because the warmest month reaches but to 59° Fahrenheit, though two months were maintained at nearly this mean heat through ten years of observations.

We append a list of the names of places beyond the limit of wheat cultivation as evidence of the law of heat influencing the wheat plant; also a series of localities where it is successfully cultivated, with the period of sowing harvesting, from the northern limit to the southern bound, and from the extr eastern, in Prince Edward's island, to the southern border in New Mexico, and the western, in California. The interest awakened by the study of this table will, we hope, induce many observers to note with method and accuracy points concerning wheat culture of which we are at present ignorant, and advance our knowledge of the demands of special varieties.

The following named places lie beyond the boundary of successful cultivation, and in the latitudes respectively appended. They have not a of 61° Fahrenheit for the hottest month, though they lie further south Fort Liard, on Mackenzie's river, latitude 60°, which probably enjoys mean, for we find it attained at Fort Simpson, on the same meridian, th nearly two degrees further north.

Beyond the north polar limit of successful wheat culture.

Sitka, Russian America	Latitude, 57° N	August temp., 59° F	Wheat does not ripen.
Fort York, on Hudson's bay	do.	July temp., 60°, summer, 54°, year, 26°.	Do.
Edmonton, on Saskatchewan river	Latitude, 53° 40′ N.	1,800 feet high	Often destroyed by frost.
Carlton House, on Saskatchewan river.	Latitude, 52° 51′ N.	1,100 feet high	Do.
Fort Liard, on McKenzie's river	Latitude, 60° N	July temp., 61°?	Grows occasionally.
St. John's, Newfoundland	Latitude, 47° 33′ N.	August temp., 58°; summer, 54°.	Wheat not grown.

Within the limits of wheat cultivation.

BRITISH NORTH AMERICA.

Locality.	Latitude north.	Temperature.	Remarks.
	° ′	°	
Fort Fraser	54 30		Longitude, 121° west; west of the Rocky mountains.
Cumberland House, on Saskatchewan river	53 57	July, 61.8	Sown May 8; reaped in August.
Red River Settlement	50 00	July, 67.0	Wheat grows luxuriantly.
Fort Francis, Rainy Lake district	48 36		Sown May 1; reaped late in August—120 days.
Quebec, Canada East	46 49	August, 67.0	Wheat succeeds.
Prince Edward's Island	46 12	August, 70.5	Extensively grown.
Frederick, New Brunswick	46 00	August, 70.0	Wheat succeeds.
Pictou, Nova Scotia	45 34	July, 66.0	August mean, 65°; wheat succeeds.

Within the limits of wheat cultivation—Continued.

UNITED STATES.

Locality.	Latitude north.	Temperature.	Sown—	Reaped—
	°	°		
; county, Me.....	46 to 47	July, 65. 0	Middle of May.....	September 1.
county, Me.....	45°00′	July, 65. 0	May 20	September 20.
county, Me.....	45 00	Aug., 70. 0	May 25 to June 1	Middle of August.
county, Me.....	45 00	Aug., 70. 0	May 25 to June 1	Aug. 20 to Sept. 20.
on county, Me.....	45 00	Aug., 63. 0	April 10 to May 10.....	September 10 to 20.
nce county, N. Y..	44 40	July, 68. 0	April to June.....	August.
nce county, N. Y..	44 40	.....	September 1 to November.....	July.
ounty, Vt.....	43 30	.....	September 18.....	July 25.
ounty, Wis	44 00	June, 70. 0	September 1	August 15.
county, Wis.....	43 00	June, 70. 0	September 1 to 15.....	July 20.
ounty, Mich.....	42 00	June, 70. 0	September 10 to 25.....	July 10 to 20.
unty, Mich.....	42 15	.....	September 5 to 25.....	July 5 to 15.
w county, Mich ...	42 15	.....	September 1 to 20.....	July 8 to 20.
ounty, N. Y.....	43 00	.....	August 15 to September 15	Late in July.
a county, N. Y.....	42 45	.....	Middle of September	July 20 to August 20.
unty, N. Y.....	42 45	.....	August 20 to September 25.....	July 15 to August 1.
unty, N. Y.....	43 00	.....	(May wheat;) September 25....	July 8.
unty, N. Y.....	42 45	.....	September 10 to 20.....	July 20.
unty, N. Y.....	42 45	.....	(Dayton wheat;) September 2..	July 13.
nty, N. Y.....	41 45	.....	(Mediterranean wheat;) September 1 to 20.	July 10 to 20.
ounty, N. Y.....	42 15	.....	August 25 to September 10	July 25.
e county, Mass.....	42 00	.....	Early in September.....	Late in July.
ounty, Iowa.....	42 00	.....	September.....	July 6 to 18.
ity, Iowa.....	42 00	.....	(Spring wheat;) April	July.
inty, Iowa	41 00	.....	September.....	July 1.
unty, Iowa.....	41 00	.....	(Spring wheat;) April 1 to 20...	July 15.
unty, Iowa.....	41 00	.....	(Winter wheat;) August 15 to September 20.	Early in July.
y, Iowa.....	40 45	.....	September	July 5 to 12.
unty, Ill.....	40 00	.....	October 1 to 15.....	June 28 to July 10.
ounty, Ill.....	38 30	.....	Last of September to October 18.	
ounty, Mo.....	39 00	.....	September 1 to last of October..	Last of June.
county, Ind.....	40 15	.....	September 15.....	July 1 to 15.
ity, Ind.....	39 30	.....	September	June 25 to July 5.
unty, Ind.....	39 45	.....	September 1 to October 15.....	June 25 to July 7.
ounty, Ohio	40 15	.....	(Soulé wheat;) Sept. 1 to 20....	July 1 to 10.
inty, Ohio.....	39 30	.....	Early in September.....	July 1.
unty, Ohio.....	39 20	.....	(Rock wheat).....	July 4.
county, Ohio.....	38 40	.....	(May wheat;) October	Last of May.
county, Ohio	41 00	.....	(Mediterranean wheat).....	July 15.
ounty, Ohio.....	39 45	.....	(Mediterranean wheat).....	June 15 to July 1.
land county, Pa...	40 30	.....	September 10 to middle of Oct..	Early in July.
unty, Pa	40 00	.....	(Mediterranean wheat;) September 1 to 20.	First week in July.
nty, Pa.....	40 30	.....	September 10 to October 1.....	July 1.
ounty, Pa.....	40 30	.....	September 1 to October 1.....	July 4 to 15.
ity, Pa	40 30	.....	(Blue stem wheat;) Sept. 10 to 15.	July 4 to 20.
ia county, Pa.....	40 00	.....	(Mediterranean wheat;) middle of September to middle of Oct.	Middle of July.

Within the limits of wheat cultivation—Continued.

UNITED STATES.

Locality.	Latitude north.	Temperature.	Sown—	Reaped—
	° ′	°		
Bergen county, N. J	41 00		October 1	July 5 to 15.
Gloucester county, N. J	39 45		October 1	July 1 to 10.
Salem county, N. J	39 30		(Mediterranean wheat;) last of September to October 7.	June 25 to July 1.
Newcastle county, Del	39 45		(Mediterranean wheat;) September 20 to October 10.	
Dover county, Del	39 00		September 20 to October 10	June 15 to 23.
Sussex county, Del	38 50		Last of Sept. to middle of Oct	Last of June to July 1.
Harford county, Md	39 45		September 1 till frozen ground	June 25 to July 15.
Jefferson county, Va	39 15		September 25 to October 15	June 25 to July 1.
Jefferson county, Va	39 15		(Mediterranean wheat;) September 4 to 23.	Third week of July.
Richmond county, Va	37 50		(Japan wheat;) Sept. 16, 1859	June 14, 1860.
Richmond county, Va	37 50		(Early Conner wheat)	June 2.
Richmond county, Va	37 50		(May wheat)	May 26, 1842.
Franklin county, Va	37 00		October 1 to December 15	June 20 to July 10.
Buckingham county, Va	37 50		October 1 to November 15	June 15 to July 4.
Mason county, Ky	38 30		(Early May wheat;) September 1 to October 15.	June 2.
Clark county, Ky	38 00		September 15 to last of October	June and July.
Logan county, Ky	37 00		October and November	June 10 to 30.
Cabarras county, N. C	35 30		(Early May wheat;) November	June 1 to 10.
Bedford county, Tenn	35 30		Middle of Sept. to middle of Nov	June 1 to 14.
Habersham county, Ga	34 45		September 15 to December 1	June 15 to July 15.
Cherokee county, Ala	34 15		October 1 to December	June 1 to 15.
Montgomery county, Ala	34 15			End of May.
Guadaloupe county, Tex	30 00	Mar., 61.0	January 1	June 1.
Santa Fé, New Mexico	36 30	June, 68.0	April	August.
Albuquerque, New Mexico	35 30	May, 63.0	February and March	Last of July.
Doña Aña county, N. Mexico	32 30	May, 71.3	Middle of January	August.
Utah Territory	43 00	May, 65.0	September 1 to May 1	June to September.
Stanislaus county, Cal			(White Chili wheat;) November	June 1.

In connexion with the foregoing the following table of the periods of sowing and harvesting wheat in several districts on the eastern continent may not be found devoid of nterest:

Locality.	Sown—	Mean time of harvest.	Time of growth.
Delta of Egypt	Nov. —	May —	
Malta	Dec. 1	May 13	One hundred and sixty-three days.
Palermo, Sicily	Dec. 1	May 20	One hundred and seventy days.
Naples	Nov. 16	June 2	One hundred and ninety-five days.
Rome	Nov. 1	July 2	Two hundred and forty-two days.
Alps, 3,000 feet	Sept. 12	Aug. 7	Three hundred and twenty-nine days.
Alps, 4,000 feet	Sept. 8	Aug. 14	Three hundred and forty days.
Central Germany	Nov. 1	July 16	One hundred and thirty-seven days.
South of England		Aug. 4	
Middle of Sweden		Aug. 4	

We have seen that success attended the attempts to grow the acclimated Saraccas wheat even in New Providence under a mean temperature of 72°, which prevails during the winter and spring of the Bahamas, when the idity is much diminished, and that varieties adapted to the region grow y on the banks of the Saskatchewan in a high northern latitude, where the ni st mean temperature of a summer month is but 61.8°. We have shown a reduction of two degrees only from the mean temperature of each day, r one or two months in Britain, curtailed a loss of one-third to one-half of the rop of wheat.* This diminution in the product brought upon thousands the of famine, and upon all increased expenditure, and upon the nation an gregate loss of millions of pounds sterling. This prospective deficiency was early foreshadowed at the close of July of that year, (1853,) and known or could have been known by those who gave attention to observations of the temperature received at the time from England and northern Europe, with some degree of clearness in anticipation of their realization.

If the diminution of the mean temperature of each day by about two degrees for one or two months over western Europe appear to be a trifling incident, its effects were of vast magnitude to commerce. Mark one of the results in stimulating the export of wheat flour and Indian corn and meal from the United States. In the preceding and following years the export of breadstuffs amounted to the values annexed thereto, as follows:

	Indian corn and meal.	Wheat and wheat flour.
In 1851 we exported	$2,300 000	$11,500,000
In 1852 we exported	2,000.000	14,000,000
In 1853 we exported	2 000,000	19,000.000
In 1854 we exported	7.000 000	40 000 000
In 1855 we exported	8,000,000	12,000,000

We perceive that though the amount of export had been increasing gradually, that in the year ending June, 1854, it trebled the corn and doubled the export of wheat and wheat flour; and that though the demand for corn increased the following year, 1855, that for wheat and wheat flour fell below the average of former years. We may perceive in the above a striking illustration of the vast results attendant upon a seemingly trifling modification of the mean temperature during a critical period in the life of a plant; realize our daily dependce on the wisdom and benevolence of creative Providence, of which every ly enlightened mind perceives fresh evidence wherever it may turn to conmer the works of Him who can bless and can blast.

In concluding this part of our subject we cannot refrain from the remark, that, in contemplating wheat culture from the point of view which we have chosen, we have been renewedly impressed with evidences of the wisdom and beneficence of the Almighty Father who watcheth over his children for good. Not only do we remark the flexibility of the cereal plants, so admirably fitted

* Since the above was written we have met with the following in a notice of "An Essay on the Meteorological Conditions which Determine the Profitable and Unprofitable Culture of Farm Crops in Scotland," by Mr. Buchan, 1860:

"The dependence of the Scottish agriculturist on the climate is significantly proclaimed by the statement that 'the chief peculiarity of the climate of Scotland, with regard to the cultivation of the corn crops, consists in the mean summer temperature being within *two degrees* of the minimum temperature required for the perfect maturity of wheat and barley crops.' The prudent Scottish agriculturist will do well to bear in mind that a variation in summer temperature, to the extent of two degrees, may blight all his hopes.—Edinburgh Journal of Agriculture, 1861."

for the food of man, and without which he could not exist a civilized b
that they are capable of adaptation, within certain limits, to the varyin
mates extending from the equator almost to the Arctic circle; but
with renewed cause for admiration, do we perceive how He who m
and poised it in space has commanded it should present at
source of heat and light and life which shall kindly temper
and divide the seasons, giving to wider zones the moderate springs
with increasing mean advance towards the north, bearing with
warmth, and just the warmth, adequate to mature the wheat, the rye,
and maize, spreading a table for millions of men where, but for this
obliquity of the axis of the earth, a waste, frozen and inhospitab
spread its barren desolation to the remorseless skies.

REMARKS ON THE ACCLIMATION OF PLANTS.

It has often been asserted, and is generally believed, that tender exotics by degrees be accustomed to a colder climate, and thus become accli Some have believed that by sowing the seeds of such plants, in the n stance, in a warm, temperate region, then collecting the seeds produced these plants and sowing them in colder districts, the species may eventu rendered hardy. Many plants, it is imagined, have become hardy, which were originally so. We are apt to suppose that plants which grow in tropical c tries must necessarily be tender, and adapted only to hot-house culture reflecting that they may have grown in very elevated and cold regions in countries. Such is the case with many species introduced from Japan, C and Nepal, which appear to be hardy in England. Of the dahlia, the heli the potato, the Lima bean, it may be said long culture has done notl increase their hardiness.

Sound views respecting the geography of plants would correct the prevailing errors regarding acclimation. The acclimatizing of plants, or, as it is supposed to be, inuring them to lower temperatures than those they have been accustomed to or have required in their native habitats, does not appear to be a possibility. It has been satisfactorily determined that a plant must receive the same amount of heat for the proper performance of certain processes necessary to the production of leaves, flowers, and fruit, whether in places to which it is indigenous, or far removed therefrom in more northern latitudes. The definite degree which it has demanded during certain epochs of growth is still required wherever it may grow; but the aggregate of heat may be received during a shorter term in high latitudes because of the greatly increased length of the day, and the processes be hastened and maturity attained at an earlier date. This is well illustrated in the growth of maize or Indian corn, which is said to be remarkably accommodating, though it must have a semi-tropical heat wherever grown, if only for a few weeks, and this heat it obtains even beyond the northern limits of the United States. It is well known that the varieties of maize grown near the northern limit of its cultivation ripen earlier than those which are esteemed valuable further south. Man has applied to his purposes the property possessed by many plants of adapting themselves to the new conditions, and the many varieties of maize, wheat, &c., attest the possibility of change within certain limits. Thus the season required by the maize varies from six months in the elevated plains of Santa Fé, in South America, to four months in the middle United States, and two and a half months in the Rainy Lake district, northwest of Lake Superior, a seemingly extraordinary transformation of its natural habits and associations. This plant must, however, enjoy for a few weeks, wherever grown, a semi-tropical mean heat of 67°, and the period required for its growth is proportioned to the abruptness of the temperature curve, or the rapid increase and high degree of heat reached during its growth. The several varieties of maize which have acquired the peculiarity

tening their period of maturity when judiciously planted, enal
to extend the cultivation over every district in which the summ
re reaches a certain point, however brief the duration of heat, p
inite aggregate adapted to each variety shall have been received
rdinary high temperature experienced in certain northern locali
rom the ocean, and the intense calorific and chemical action of th
enhanced by the extreme length of the days of summer, enable thi
ture in high northern latitudes. From the success that has a
owth of many varieties of maize, it is supposed that many other
e acclimated, and that those whose epoch of growth would extend
. of low temperatures in northern localities may, like the maize,
lly carried towards the pole, if but new varieties adapted to the n
s could be produced. Such hopeful experimenters forget that th
iving on its further northern border the same, or nearly the same,
f heat it demands in its most favored clime, is exposed to the in
e same high mean during its most critical period, and, consequen
ate its juices and mature its seed as well in the shorter hot seasor
as in the more temperate longer season of the south.

e principle above enunciated is, however, subject to some modif
gards its application to certain physiological changes which hav
red to result from long-continued efforts to cultivate plants unc
l conditions. Plants are, without doubt, capable of modification
n limits. Witness the numberless varieties of grains and fruits, s
appear to be more hardy than their progenitors. Many of these
r to, or really do, thrive in more northern districts than those fron
were derived, have merely acquired a greater susceptibility to th
of light and heat, and are thence aroused into earlier action, qu
eir vital functions, and mature under a lesser aggregate of
ired by the thermometer, though for the critical periods of their e
demand the same mean temperature as the original from which the
ed.

s in the power of man to fix these peculiarities when observed, a
ire to produce them by the selection of those which promise w
uing the selection with adequate care through several generations
, by skilfully applying the principles which influence plants in th
es to sport into new varieties and directing them into the desired c
most created a new race of beets containing twice as much sugar
tors, and promising to be readily perpetuated.*

climating the tender plants of the tropics, and inuring them to t
ns of the north or temperate latitudes, is, therefore, impossible,
minor modifications upon those of short growth during the per
heat of the northern summer have been made. The olive a
e have not been rendered more hardy, and the peach appears to
red with the same tenderness of bud it has always shown.

e difficulties of acclimation may be illustrated by the fact that
able products can be grown in particular latitudes, while others,
nay attain considerable size, cannot be grown with any useful resu
ce, in England the vine will never yield grapes capable of makin
of a quality equal to champagne; nor will tobacco ever acquire tha
rinciple which gives it, in the estimation of many, so great a valu
in some other countries; and yet both the vine and the tobacc
h in the soil of England. The botanist and the meteorolog

* Silliman's Journal of Science, vol. XXII, p. 448, new series

explain why this is so, and thus prevent the commencement of speculations which must end in loss and disappointment.

It is of great importance to be able to define accurately when a plant may be said to suit a particular climate. It is not enough that it live and send out leaves: it must be able to produce flowers and seeds and to elaborate the peculiar secretions and products on which its qualities depend. Indian hemp has grown in England, even, to the height of ten feet, with thick stems, vigorous leaves, and abundance of flowers, but it did not produce the resinous matter upon which its supposed value as a medicinal agent depends.

The rhubarb of Turkey, which, as regards size and vigor of the thrives well in England, does not produce a root of any medicinal va or a the same quality as that grown in Chinese Tartary, from which, though as "Turkey rhubarb," it is derived.

The leaves of the tea plant are harmless, or but slightly stimulating in latitudes, while they become narcotic and unwholesome in others. T can be explained by the study of the connexion which exists between cl and vegetation—a question to be solved by the botanist and meteorol is science only that can explain the failure of attempts to cultivate plant in Madeira and in the Indian archipelago, while a variety of the Ca plant is now cultivated in the upper districts of India with great success.

The introduction of tea culture into India—a culture which is likely to b of vast importance—had its origin in the observation made by English t that a kind of tea plant was indigenous in Assam. The discovery had made ten years previous, but from the absence of competent botani consequent ignorance of the true character of the plants, it was not turned to profitable account. It is to the published opinions of Dr. Royle, who, from a consideration of the similarity of latitude, climate and vegetation, as far as any information could be obtained, was of the opinion that tea could be successfully cultivated in the Himalayan mountains, we are to ascribe the practical adoption of plans that have been, after a long and arduous struggle, attended with complete success. Basing his opinion upon the known varieties in climate corresponding to varying elevations, he suggested the propriety of experimental planting in certain districts in the mountains elevated about 5,000 feet above the sea.

The success attending the experiment, when fully established on a sound basis, produced a remarkable demand for land, and applications for grants poured in, and were complied with by the government on most liberal terms. In Assam alone there are now upwards of 160 plantations owned by sixty companies and individuals, which occupy 20,000 acres of land actually under tea cultivation, bearing an estimated annual crop of 2,000,000 pounds of tea; while grants of land to the amount of 123,000 acres for tea-growing had been made up to the end of 1863. In Cachar, an adjacent province, more than 6,000 acres have been brought under cultivation, and the crop is estimated at nearly 400,000 pounds of tea. In the northwest provinces, and in the Punjab, where the Chinese tea plant is cultivated, the rate of progress appears to be most remarkable, where the statistics, which may be called marvellous, prove the movement to be a national one. The native princes, the Maharaja of Cashmere, the Raja of Nadawn, and several other Rajas, English and native planters, among the Himalayas, are entering largely into the culture, and the demand for seed and plants has been so great that in 1862 eighty-nine tons of the former and two million four hundred thousand of the latter were distributed gratis by the government, yet the demand was not supplied.* All that has been done and is doing for tea culture in India is but a feeble foreshadowing

* Tea cultivation, cotton, and other agricultural experiments in India—a review by W. Nassau Lees, LL.D

normous cultivation and trade. We are told that tea plants are now over 4½° of latitude and 80° of longitude, a tract containing 35,000 miles, capable of producing, were the area all planted, upwards of ,000 pounds of tea, and with high cultivation of doubling this high

e the valley of the Brahmapootra and the slopes of the lowest range Himalayas are being clothed with tea plantations, the cultivation of as advanced with rapid strides in the highlands of southern India. The tion of the plant is by tradition ascribed to a Mahomedan pilgrim, who seven berries of coffee from Mocha, about two centuries ago, and them near his hermitage in the wild hills of Mysore. But it is only years that the produce has been considerable. Under improved ad- itions, and regulation of the modes of taking up and holding land, the extending over tens of thousands of acres. The number of native is estimated at nearly four thousand, and is fast increasing in numbers. ore, where but little available land remains, the mountain and forest have been turned into rich productive gardens. From being the most d desolate parts of Mysore, these districts have become prosperous, and ple have been raised from poverty to comfort, and in many instances to

e is another plant which promises to take a high place in point of interest lue among the products of India. The credit of first suggesting the ntation of cinchona trees, or those producing quinine, into India, is Dr. Royle, who pointed out the Neilgherry hills as suitable sites for the ent. Here are found a climate, an amount of moisture, a vegetation, elevation above the sea, more analogous to those of the cinchona in South America than can be met with in any other part of India. accordingly, the large body of plants conveyed in Wardian cases from d Ecuador, where they were collected by Mr. C. R. Markham, under difficulties and discouragements, were finally planted, to become the of millions of future denizens of this delightful region. The many s of cinchona, each requiring its peculiar climate as respects warmth, y, and protection, as well as soil and elevation, were here each provided e requisites for healthy and successful growth. Already upwards of) plants of the eleven species of cinchona are growing, and permanent ons established to the number of 40,000 trees, and the prospect for the ve cultivation by private enterprise is already very encouraging.*

r the combined influences of liberal grants of land, wise expenditure roving the modes of intercommunication and increasing on a magnificent e means of irrigation, and the recent planting among the agriculturists a, the productive cultivation of the staples above referred to, the torpor uries is fast giving way before the quickening influences of science to the practical purposes of life. In the language of the Edinburgh : "The wheels of progress are fairly set in motion, and it demands but powers of observation to see that society is moving onward at a pace Anglo Saxon in its rapidity."

above afford very striking examples of the value of an acquaintance e botanical peculiarities of plants combined with accurate knowledge of imatic requirements. Those only who are acquainted with botanical hy could point out the most efficient methods of conducting the ex- its to a successful issue. They also furnish evidence of the grand that may follow the wise application of the power of government when l by accurate knowledge. Agriculture, trade, fortune, food, population, may all be powerfully affected by the transfer of a little packet of seed,

* Edinburgh Review for October, 1863.

CONCLUDING REMARKS ON THE NECESSITY FOR A MORE ENLIGHTENED AGRICULTURE IN THE UNITED STATES.

We do not flatter ourselves that we have developed anything in the foregoing pages particularly novel or especially valuable. We shall be if, by giving to our agricultural friends an outline of the vegetation of the as affected by climatic peculiarities, accompanied by some illustrations o value of a right application of a knowledge of botanical geography, we : in inviting their attention to those which influence our own land, and so int them that they may be induced to observe and study for themselves the nomena of meteorology and vegetable physiology, &c., in connexion with progress of their crops and the various processes of vegetation. If we ceed in awakening some indifferent ones to a just conception of the impor of the subject, in order to a correct understanding of American agri and in exhibiting to them and others how they may aid in placing it u scientific basis, the only sound basis upon which anything dependent upo influences of natural phenomena can be built, we shall not have occasio regret our effort.

Though man has lived upon the earth several thousand years, and has tilled the ground and reaped its products, he yet knows but little of the art, still less of the science of agriculture. What he has learned is merely the result of groping in the dark, the fruits of conjecture and experiment unguided by a knowledge of principles. Were the practitioners of every other art as ignorant of the principles upon which their processes are founded, we would not have emerged from the darkness of past ages, and almost every modern discovery and invention would be unknown. It is to modern science that we are indebted for our progress in physical comforts and the vast accessions of enjoyment which have been added to the lives of the cultivated classes, and which are partaken of, in measure, by even the least intellectual. Very few of these great discoveries have been made by chance and by ignorant persons, much fewer than is by some supposed. They have generally been made by persons of competent knowledge, who have sought for them, and who have met their reward through much pains-taking investigation. The facts that have gradually accumulated, the observations recorded by patient observers, have been applied by those who were more skilled, and who have been led to extend their inquiries beyond the depths already known, and to bring up therefrom new truths which add to the pleasure or the well-being of mankind.

They who are themselves unacquainted with the principles of their art must be incapable of employing opportunities for experiment, must be unable to observe aright or to investigate, and can never strike out anything new that may be useful in art, or curious or interesting in science. They, on the other hand, who are familiar with the reasons for the processes they employ may, perhaps, become improvers of the art they work at, or even discoverers in the science connected with it. They are daily handling the tools and materials with which new experiments are to be made, daily witnessing the operations of nature, are always in the way of perceiving what is wanting or what is amiss in the old methods, and have a better opportunity for making improvements, and, if they possess the requisite ability, can take advantage of them; for, as has been well said by an able writer on the chemistry of agriculture: "He that is master of principles is like a watchman in a belfry—the whole city is before him. He who cannot rise above detail is like a man in an alley, who does not know what is passing in the next street."

It is by no means necessary that a man should do nothing else but study known truths, or devote himself to investigation, in order to become skilled in the knowledge of the principles of his art or profession. Some of the greatest men of science have been engaged in the pursuits of active life, devoting to

dy only a modicum of time beyond that required by the demands of busi-
ss. One of the most successful farmers of Europe is also one of the most profound of philosophers, and has written one of the most valuable works on economy of agriculture extant.* The time has passed when it was deemed rd to consider these callings incompatible, and he who now deems the ap-ication of science to agriculture a theme for ridicule has himself become a fair ject for the pity, if not for the contempt, of well-informed men.

Every farmer knows that the quantity of produce which may be obtained from a given space of ground varies much, other things being equal, according to the skill of the cultivator; but every one is not aware that skill is in reality merely the application of the rules of vegetable physiology to each particular case. This application is frequently made by those who are unconscious of the derivation of the rules. We are apt to overlook the causes that have influenced a course of practice, and to ascribe the improvement we witness to a mere advance in art, not considering that the advance must have had a cause, and that the cause can only be the work of some master-hand, which is afterwards blindly followed by the community.

The introduction of new or improved varieties of fruits has doubled and trebled the produce in many districts of our country. But how many who profit by the change, who are enriched by the increase, consider that they owe all this to the patient skill of the vegetable physiologist and horticulturist? The new varieties of the potato, many of which greatly surpass in productiveness the older sorts, are greedily sought by the farmer, and the names of Garnet, Chili, Cuzco, and Pink-eye Rusty-coat, *et id omne genus*, are in every mouth. But who considers the skill and care, the knowledge of the laws of vegetable growth, the research into the chemistry of vegetation, or the patient, laborious application of knowledge derived from a profound study of botanical principles, all of which are involved in the production of a new sort, or even turns to ponder the name of him who has proved a benefactor to his species? †

How many farmers know that to Thomas Andrew Knight, an English gentleman of wealth and education, and the best practical gardener of his day, we owe those experiments in vegetable physiology which have resulted in the production of a vast number of new varieties of apples, pears, plums, cherries, &c., of great value, both in England and in this country? How many are aware that the principles this philosopher advanced have led to still greater improvements among our own horticulturists, and seem destined to produce others, of the magnitude and importance of which he forms no conception! Who that cultivates the turnip, a crop yet to be largely extended in this country, and which is the most important in England, where it is the great foundation of all the best systems of cropping, remembers that it is to an English statesman, Viscount Charles Townshend, able and honest in an intriguing government, chief minister to George I, we owe the introduction of this invaluable root into England? ‡ In this seeming simple act of urging upon the farmers of Britain the cultivation of this apparently contemptible root, he has done more for his fellow-countrymen than whole galleries of famous politicians, who, instead of being benefactors, rather merit the denunciation of the poet, as—

"Destroyers rightlier called, and plagues of men."

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* Boussingault's Rural Economy.

† Since the above was written we have with pleasure remarked the effort now making by many farmers of the State of New York towards obtaining means for a testimonial fund, for presentation to C. E. Goodrich, as an evidence of their appreciation of his long, laborious, and unremunerated labors for the improvement and culture of the potato. Such actions merit unqualified praise, and are as creditable to the donors as to the worthy recipient.

‡ This has been questioned; but if he did not originally introduce, he aided greatly in extending its cultivation and usefulness. His sobriquet of "Turnip Townshend" strengthens our position that he introduced the turnip into districts where it was unknown.

A long series of the names of benefactors of the farmer might be given—men who have expended fortunes in experiments, or given the labor of their lives in elevating the calling, by studying the improvements found in other countries, and, amid obloquy and ridicule, planting them among their own people.

Sir Richard Weston, who introduced clover into England about 1645, was a diplomatist and ambassador of James I to the Elector Palatine.

John Evelyn, whose "Sylva" gave a great impetus to rural pursuits the landed gentry of England, was employed in public service.

Jethro Tull, who introduced the drill husbandry, was a barrister, yet the first to recommend and practice horse-hoeing, and that but a century a half ago.

Smith, of Deanston, whose system of draining has brought millions to the English agriculturists, was a proprietor of cotton works.

Arthur Young, who carried on experiments of every kind regardless of expense, "and in fact, by his enthusiasm, outfarmed himself," who saw through his own losses his country's gain, and by his tours through England and Wales and on the continent, and his numerous publications and observations for the general good, conferred a vast benefit upon agricultural interests, "was just the man not to farm profitably," but the very man destined to give more practical and cautious men a sufficient impetus to lift them out of the stagnation in which they had been bred, and in which, were it not for the influence of such men, they would ever remain.

Coke, afterwards earl of Leicester, must conclude our list of the great benefactors of the farmer and elevators of the agriculturist above the dull, dead level of ancestral routine. Such innovators have almost invariably arisen from outside the profession, the barrister, the retired manufacturer, the statesman, the nobleman, and the prince having each in turn aided in advancing the cause of improved culture of the soil, in which all have a common interest. The improvements made by Mr. Coke were extraordinary. By skill, capital, and enterprise he became the founder of the agriculture of immense estates, which he transformed from blowing sand and flinty gravel to a fertile domain. Tracts that were not worth to a tenant three shillings an acre became under his management, and that of those to whom his judicious leasies gave an enduring interest, capable of producing eighty bushels of barley per acre, which was double the average product of the county of Norfolk, in which his estates lay, and treble that of many counties of the kingdom to this day.

The names of many others might be added to the above names, *that, by the great example of what they have accomplished, encourage us to have faith in improvements yet to come.* These are the genuine heroes, the conquerors of ignorance and prejudice, who have crowned themselves with ennobling honors, heroes whose memory the world should not willingly let die.

No country can boast a greater number of intelligent farmers than can the northern section of the United States; nowhere else are agricultural periodicals and standard publications more largely patronized; in no other country are the discoveries and experience of the better-informed, or more skilful, or more curious sooner made available for the benefit of all; nowhere else exist a people enjoying so free intercourse, or so prone to use the opportunities locomotive and epistolary; no country exhibits a more varied surface or more varied produce; in fine, no other people possess more largely all the materials for the promotion and exhibition of an enlightened agriculture; but though, as farmers, we surpass those of every other country, England and Belgium, perhaps, excepted, we are still very far from possessing that enlightened acquaintance with its principles the avocation demands and our opportunities afford. Unfortunately the sum of mental training enjoyed by the sons of farmers is generally but the meagre teaching of the common school, which, though valuable as it is in comparison with that afforded to the people of other

lands, Prussia excepted, falls far below the actual demands of the age and of the profession. There are, however, many hundreds of young farmers who have received an academic or collegiate education, and have, by self-instruction based thereon, (which is, indeed, the only education truly valuable, for the academy and the college but teach how to learn,) made themselves masters of the general principles of their art. On these devolve the duty to aid their brothers by putting them forward on the track of improvement. To all such we would hold out words of invitation to come forward and engage in this useful and honorable work. A wide field is open to all willing laborers, who, with observing faculties, trained by knowledge of the elements of natural and physical science to note the phenomena occurring around them daily, can with judgment record and report the results of their observations to those who, by condensing and tabulating, shall make their multifarious notes available for the instruction of their fellows.

"Whatever is individual and peculiar in our country must be studied by ourselves; we cannot expect the savans of Europe to make the investigation for us. Many practical questions in American agriculture demand answers, and success cannot be expected without the union of science with practical experience."

The climate of the United States is a peculiar one, marked by extremes of heat and cold, of wet and dry. It is as essential to study its characteristics as it is to determine the properties of our various soils. A want of meteorological knowledge and consequent want of adaptation of our industry to the laws of climate, both general and local, is a frequent source of loss to the farmer. A system of observations is efficiently carried on by the Smithsonian Institution, at Washington, D. C., aided by numerous correspondents in almost every State and Territory, through which it is hoped the climate of the United States will yet be as thoroughly understood as its geology and its geography. This kind of information is one of the essential elements on which to found a system of scientific agriculture adapted to the various local climates of the different portions of our extended country. The degree of heat and cold and moisture in various localities, and the usual periods of their occurrence, together with their effects upon different agricultural productions, are of incalculable importance in aiding research into the laws by which the growth of such products is regulated, and will enable the farmer to judge with some degree of certainty whether any given article can be profitably cultivated. Many wide sections of our country are, however, left without an observer, and we are in ignorance of the peculiar climate of districts almost in our midst. The amount of rain which falls along the sea-shore of New Jersey, from Cape May to Sandy Hook, and in the interior, midway between the river and the ocean, has never been observed or reported, nor do we know the mean temperature of any place throughout this entire region for any season. That it differs from the climate of southeastern Pennsylvania is apparent, but wherein, and to what degree, has not been determined. The foregoing is but one of many regions that might be named wherein observations might be profitably instituted. To aid in this good work should be the desire of every educated farmer. He may enter upon a series of observations on the weather with proper instruments at command, in which employment he will find not only pleasure, but positive benefit from the knowledge acquired and the habits of method and close attention the practice will induce.

There is a wide field open to all, and in which the skilful and persevering may calculate upon success. In the efforts at improving our fruits, grains, and vegetables many will find both pleasure and profit. This field is but partially occupied, and is one in which there is ample room for many experimenters, who, if they bring an ordinary amount of attention and knowledge of plants and their physiology, will be certain to reap a harvest. Those who propose to experiment in the improvement of wheat by selection and cultivation may consult

with profit an article on the subject, taken from the "North British Agriculturist," republished in "The Country Gentleman," volume XVIII, page 219, (1861;) also Mr. Hallett's description of his mode of procedure, an extract from his published results, may be found in "The Annual of Scientific Discovery," for 1864, edited by D. A. Wells, M. D., pages 307, 308. Experimenters in hybridization or cross-fertilization may find some light thrown on the process followed by Mr. Maund in the production of his hybrid wheats, exhibited at the Industrial Exhibition in London in 1851, by consulting the Patent Office Report, agricultural division, for 1855, pages 181, 186; also "The Wheat Plant," by John H. Klippart, pages 81–85, a work abounding in valuable information, interesting to every farmer, and especially interesting to the wheat-growers of the great State of Ohio, from whom its statistics were mainly derived.

In an industrial point of view the production of a new prolific variety of any of the cereal grains—wheat, oats, rye, or maize—is of immense national importance. A new variety which will yield a few bushels more per acre over the ordinary kinds would greatly increase the aggregate yield of our soils.* In this direction an extensive and inviting field is open to experimenters. The same may be said of many other products of the soil, which, by judicious selection or careful hybridization might be greatly improved. The success which has attended the efforts of many amateur cultivators in their attempts to produce new varieties of fruits should encourage renewed efforts. Dr. J. P. Kirtland, of Cleveland, Ohio, has produced no less than twenty-eight varieties of excellent cherries, which were esteemed by his pomological friends as surpassing most of the old and best varieties. Strange as it may seem, and unwilling as we may be to believe, that one experimenter could in a short time originate so many superior varieties of cherries, it is nevertheless true that such have been produced, and, also, that time but confirms the good opinion early formed of them, and the belief that they will take precedence over all other kinds yet introduced. The experiments in hybridization instituted by Edward Rogers, of Salem, Massachusetts, which, it is believed, have resulted in the production of several excellent varieties of grapes, will incite others to enter this line of experiment with hopes of similar results.

There is much room for improvement in our fruits by the selection of seed of good varieties for the production of hardier kinds, or better adapted to their place of origin. Hon. Marshal P. Wilder remarks:

"The immense loss sustained by American cultivators who have attempted to introduce varieties of fruits not adapted to the soil and climate, suggest the importance of raising from seed native sorts which, in most instances, possess some peculiar advantage. It is now generally conceded that the plants indigenous to a country will flourish at home better than those that have had their origin in foreign localities."—Proceedings of American Pomological Society, 1854, p. 12.

The United States possesses a very varied flora, which has not been fully illustrated. There are many sections whose herbs, shrubs, and trees are not fully known. As every educated farmer, it is presumed, has made some acquaintance with botany, and unless he has, he can make but minor claims to education, as this science is of the first importance in his profession, he can readily observe and record the names of all the forest trees at least; and if he can catalogue the common minor plants, or all that are met with in his township or wider district, his contribution would become so much the more valuable, as more full and minute. Such catalogues, returned from every section of the

* Dr. Voelcker, in a recent lecture before the Royal Institution, London, stated that in the county of Norfolk the average produce of wheat was, in 1773, fifteen bushels per acre; in 1796, twenty-eight bushels per acre; in 1862, thirty two to thirty-six bushels per acre, the increase being due to drainage, tillage, and to the *growth of improved varieties*.—Annual of Scientific Discovery, 1864, p. 202.

Union, would prove of great value to those who have occupied themselves in tempts to thoroughly elucidate the productions, climate, and physical geography r our country.

Every farmer, even the uneducated, may contribute to the progress of his , by observing the dates of the chief periods in the vegetation of plants. et him make notes of the time of seeding and of germination, the periods of s revival in spring, the date of blooming of various grain-producing plants r maturity, &c., regarding especially in each case the peculiar *variety*. Let observe the dates of leafing, blooming and ripening of the various kinds peaches, pears, apples, grapes, &c., noting, particularly, the especial variety, r it is upon this that the value of such notes will depend. If the observer ombine with these notes of the changes in vegetation well-ascertained facts f mean temperature and humidity derived from daily observations of the air, ., his contributions will become of much higher value. It is a knowledge, minute facts, some of which might be regarded by many as too insignificant or notice, that is occasionally found to afford the safest guide in many questions f difficulty in agriculture as in every other art. Every farmer may also aid he cause by assisting the agent of the Commissioner of Agriculture in each county of every State, in his inquiries into the condition of the crops, by collecting statistics, &c., &c., and by encouraging the work he has begun, and strengthening his zealous labors in our behalf.

Every cultivated mind of healthy activity has felt the need of an object upon which it can concentrate its powers. In this connexion, the language of he distinguished Secretary of the Smithsonian Institution appears especially nstructive, and deserving the attention of the educated sons of farmers:

"It is scarcely possible to estimate too highly, in reference to the happiness of the individual, as well as to the promotion of knowledge, the choice in early life of some object to which the thoughts can be habitually turned during moments of leisure, and to which observations may be directed during periods of recreation, relative to which facts may be gleaned from casual reading and during journeys of business or pleasure. It is well that every one should have some favorite subject of which he has a more minute knowledge than any of his neighbors. It is well that he should know some one thing profoundly, in order that he may estimate by it his deficiencies in others."—Report of Dr. Joseph Henry, Secretary of Smithsonian Institution, 1857, p. 25.

It should not be matter for surprise that more farmers become insane in proportion to their number than the members of any other profession, when we consider the extent to which their muscles are tasked at the expense of the brain. "Their life is a dull routine; there is a sameness and tameness about it, a paucity of subjects for contemplation most dangerous to mental integrity."* The proper remedy against the sad effects of a plodding routine existence is increased mental activity, a more harmonious exercise of muscle and of mind. It is a sad truth that the majority of young farmers grow up like ill weeds, untrained, uncultivated, untaught in the natural and physical sciences, for studying which they have so ample opportunities. Declining too often on the vulgar level of debasing pleasures, they refuse the sweets of literature and the delights of knowledge until they are left without an aspiration beyond the acquisition of wealth or the mere continuance of animal existence. Never taught to respect their profession, what marvel that they should not esteem it the most important as well as the most interesting and the most delightful that can occupy attention of a mind rightly constituted and properly educated; that the dy of its principles and their judicious application to practice afford scope every faculty to the fullest extent; that it is in truth a profession worthy ne mental powers of any man be he ever so intellectual. In England the study

* See an excellent article on the "Health of Farmers' Families" in Report of the Agricul- Department, 1862, an article that should be read again and again in every farmers' y in the land.

of the principles and practice of farming engage the attention of the advanced minds, and the educated gentry enter with zeal into agri pursuits. No problems which task the powers of the mathematician, no p of law which plague the lawyer, no questions of medicine which bother doctor, are half as difficult, half as instructive, or half as important, as problems of agriculture. Instead of regarding it as a drudgery and u the attention of the clever sons of farmers, if they could view it ar t, would see in their profession a wide and promising field for scientific rese an elevated arena in which to exercise and task their mental powers, and in which distinction may be attained, and that more worthily than thro real drudgery of professions of very questionable utility.

If to the eye of taste a waste uncultivated field is repulsive, what to the eye of educated judgments is a waste neglected mind? What opportunities for benefiting the possessor, his neighbors, his country and his age, lie fallow and unimproved. Here are energies but stimulating the growth of noisome weeds; there, the barrenness of death. Such do we daily see around us among the young men—the young farmers of our land. They know not or heed not the opportunities for improvement that surround them, that press upon them, nay, that solicit their acceptance of the boon of culture. Alas, how many of them have yet to learn that "an enlightened people understand that in our age culture is the only true distinction among nations," and equally among individuals which compose the nation.

"Why should agricultural wisdom continue to be a groping backward and downward instead of forward and upward; a digging among old fossils, rather than penetrating originalities?" Why should not farmers become intellectual and progressive? Does not superior intelligence in farming as in every other calling make the better workman? Does not the well being and progress of the country depend upon the farmers, and their wise application of the teachings of advancing science? "A man may be a farmer, no doubt, in most unblessed ignorance of the physical phenomena occurring around him, but ignorant he cannot be without experiencing the baleful effects of ignorance. And seeing that all terrestrial arrangements, however apparently unconnected, do eventually mingle and combine in the production of the results ordained by the intelligence of the Supremely Wise, we believe it most injurious to the interests of agriculture that farmers should have but a limited acquaintance with those complex agencies which must be in harmonious co-operation before even a blade of grass can spring from the soil."

No art or calling requires for its full comprehension and perfect practice the aid of as many branches of systematized knowledge as does that of the farmer. No profession claims a wider range of wants or calls more largely on the man of science, or sooner exhausts his attainments. Witness already the applications of chemistry which have caused a growth beyond its ability to supply adequate information in explanation of new difficulties which the acute practical mind is daily meeting with. It ought not to be expected of science that it should explain every difficulty as it arises, or make plain every anomaly in cultivation, or render the art of farming as certain and as easily understood and practiced as the manufacture of cloth or iron. The perfect practice of agriculture is a subject infinitely more difficult and profound than any other art, mechanical or manufacturing. "Agriculture, in its true sense, is an encyclopedia in itself—requiring great knowledge, fine powers of observation, high mental cultivation, assiduous thought and study." The intelligent and educated young farmer, who enters upon the business imbued with the right spirit, will find that when the torch of science shall have illumined the field of his labors, he will discover attractions in the many operations of the farm to which he is now a stranger. The dew, the rain, the sun, the winds, the clouds, the clear sky, the floods and the droughts, the rocks, the soils, the native plants and the introduced

weeds, the chemistry and physiology of vegetation, and all the myriad operations that are daily occurring around him, will become like so many volumes of a mighty library teeming with mysteries, but each of which he is prepared to peruse, and, in measure, to understand.

It has been laid to the charge of science that in its deductions it is often at war with itself, and such it must be, because it is progressive. It is in fact undeveloped, but struggling towards a more perfect stage. It has, perhaps, promised more than it has performed, but much more has been expected of it than should have been promised. It is much to have dissipated into "thin air" the old, erroneous notions in agriculture, and to have placed us upon the track of rational investigation. Practical knowledge of our calling is of prime importance; observation and experience must ever be the foundations on which to build the superstructure of science, and we are convinced that it is not by theoretical instruction in the halls of any college that agriculture is to advance, or that the present generation of farmers is to be rendered an improvement on the last, if they do not add to that clearer insight into the principles of their art which it is the mission of science to teach, the industry and thrift, the business capacity and judgment of their fathers, and combine therewith, through *self-instruction*, a higher and truer culture of mind and heart.

The earnest student of the very interesting branch of inquiry, a very meagre sketch of which we have attempted in the foregoing pages, will attentively peruse the following popular works, which should be found in the library of every inquiring farmer, and be studied by their sons and daughters throughout the land: Mary Somerville's Physical Geography, Guyot's "Earth and Man," Humboldt's Aspects of Nature, Schould's Earth Plants and Man, and Boussingault's Rural Economy.

A popular geographical botany, with a preface by Dr. Danberry, will be found very instructive, but for more minute and extended information he will consult Murray's Encyclopedia of Geography, volume I, pages 236–254, and volume II, pages 406–425; Balfour's Text-Book of Botany; Dr. Darlington's Agricultural Botany; De Candolle's Geographical Botany; Johnston's Physical Atlas; Agassiz's Lake Superior; Dr. Cooper on the Distribution of the Forest Trees in North America, in the Patent Office Report (Agricultural) for 1860, and Smithsonian Report for 1858; Blodget's Agricultural Climatology of the United States, in Patent Office Report (Agricultural) for 1853; Russell's Lectures on Meteorology, in Smithsonian Report, 1854; Blodget's Climatology of the United States; and various excellent articles by Dr. Joseph Henry, of the Smithsonian, in the valuable reports of that institution for 1855 and 1856, and in the Patent Office Reports (agricultural division) for 1856, 1857, 1858, and 1859.

COAL-OIL IN WEST VIRGINIA.

BY C. H. SHATTUCK, PARKERSBURG, WEST VIRGINIA.

ANIMAL oils, rushes, resinous knots, even nutshells, and other substances have been used at different times as light-producers.

It is not necessary, however, in this article to dwell on obsolete illuminations except as they may incidentally exhibit to better advantage the important position which petroleum, as a light-producer, occupies before the world.

The large quantities of this substance now consumed invest every place in which it is found with an importance corresponding to the amount produced. Even a cursory examination of this subject will excite no little wonder at the great productiveness of some of the oil regions of this country; and it will also strike the observer with surprise when he remembers the tardiness with which

the wealth of these regions was developed. It would have been hard convinced, six years ago, even the least sceptical on such subjects, tha we would have wells right in our midst yielding thousands upon thou gallons of oil daily.

The history of petroleum in America commences in Indian times. T settlers in this country found the Indians using it for medicines, for in their religious ceremonies. But whatever may have been the knowle uses of petroleum in this country up to the present time, it is now c henceforth it must hold a prominent place among the articles of comm must not be supposed that the history of petroleum commences in Ame

As a fuel it is no stranger to the French, to the dwellers on the Cas to the Norwegians. As an illuminating agent it is fast supplanting th and vegetable oils. The lamps of India are fed by it; the streets of G illuminated by means of it; and there is, perhaps, no considerable cit in the Old or New World, where the new forms of lamps adapted to th kerosene are not found in use.

Many scientific men have affirmed that the slime with which the ar the tower of Babel cemented their structure was composed in part of t coal-oil. The walls of Babylon were smeared with it, and the Dead se we are told buries Sodom and Gomorrah, is a basin in which rock-oil fusely accumulated.

The Spaniards who discovered Trinidad, we are informed, gazed with ment upon a lake of pure petroleum. Rock-oil is found in Sicily, illuminated its cities. Italy, France, and England, all have had their re of petroleum. Whether we consider either the abundance of the supply great comfort and benefit derived from the use of petroleum, its recent di in this country must be ranked as one of the greatest events of the ag pumping, barrelling, and refining of it, will require the labor and rew diligence of multitudes of men, and as an article for light, as well as for manufacturing purposes, it will ever be in demand. It is well kno Seneca or rock-oil has long been famous for its medical properties; litt ever, did those who used it in small quantities for this purpose dream abundant reservoirs which slumbered so quietly in their subterranea We find that no practical movement was made in search of the nativ until as late as the year 1854, when a company, Messrs. Eveleth & Bi New York, organized and made preparations for boring on Oil creek, V county, Pennsylvania; still, it was not until 1858 that the borings p success. This delay was not owing to a scarcity of oil, as events af proved, but rather to a want of energy in pushing the work to com probably a lack of confidence in final success. The first well, at the d seventy-one feet, developed the oil; the yield at first was but four l gallons, but soon arose to one thousand gallons daily. Enthusiasm no in earnest, and Titusville, a small town near the well on Oil creek, ros long obscurity to great distinction. Meanwhile attention was turned i directions, and from this epoch we date the history of the

OIL INTEREST OF WEST VIRGINIA.

With the oil excitement at its height in Pennsylvania, of course it long before the coal-oil business of West Virginia began to teem wi operations, and enterprising capitalists diligently engaged in collecting stores of petroleum which were discovered in her territory. The first o in West Virginia were J. T. Johnston & Co., from near Pittsburg. Th ties commenced their operations on Hughes river, Wirt county, in No 1859. They bored a number of wells with varying success. So Messrs. Hazlet & Co., of Wheeling, began to operate in the vicinity o leum, (a small town and station named from the product of the region, line of the Northwestern Virginia railroad. These gentlemen were m

cessful than the parties last named; and this same vicinity has remained one of most prolific portions of the oil regions of this State. We are at this time ble to give accurately the yearly yield of this region, yet we know that it been and is still very great.

In the spring of 1860 Mr. S. D. Karnes leased from Mr. John V. Rathbone n old well which, in former years, had been bored for salt purposes. This ell was situated on Kanawha river, in Wirt county, eight miles above the own of Elizabeth, the county seat. In the hands of Mr. Karnes it proved ery productive, yielding from fifteen hundred to two thousand gallons daily.

The oil now commanded a good price in market, and it became manifest at this region (known as Burning Spring, from a gas spring in the neighborod) was certain to reward the labors of operators. The attention of many is immediately turned to this district, and when, in December, 1860, Mr. J. J. Rathbone bored a well, and pumped from it daily from eight to ten thousand lons of oil, the excitement became great. There were now three districts oducing abundant supplies of petroleum in West Virginia. Men of all es—mechanics, lawyers, laborers of all kinds—turned their feet in this rection, and soon became actively engaged in the business of procuring and ipping oil. All the land in the immediate vicinity of the working or producing wells, and much at a distance from them, was leased or purchased by apitalists eager to embark in the business. Buildings in the neighborhood, which had rejoiced in the name of hotel or inn, were speedily crowded to overlowing; quiet farm-houses, hitherto only humble and unpretending dwellings, e forced from a quiet obscurity to a bustling notoriety. The farms of J. C. a J. V. Rathbone soon became a city of huts. Nothing could be seen but great piles of barrels, derricks, scaffolds, and cisterns; nothing heard but the puff of the steam-engine, and the click, click, of the drill!

The process of boring or drilling is simple. The drill generally used is about eighteen inches in length, shaped at the point quite like the hand drills commonly used by quarrymen, and corresponding in size to the well wished to be bored. This is secured to the auger stem, a two-inch round iron bar from teen to twenty feet long, weighing, probably, from three to four hundred pounds. This is raised from the rock or bottom of the well twelve to twenty inches, as the case may be, either by the application of steam or lever power, and the fall of the iron from these heights does the drilling. By the steam power the drill will strike from twenty-five to forty times per minute. Poles are attached as the well deepens.

To those unacquainted the process would seem tedious; yet drilling or boring in such material as is usually found in West Virginia, from the surface to a depth of four hundred feet, will average, probably, twelve feet per every twenty-four hours. The usual diameter of wells is four inches.

West Virginia now began to rejoice over her newly developed sources of wealth, and to look forward to a bright future. The "peculiar institution" of Virginia had hitherto excluded many men from her limits. Indeed, so well understood had this fact become, that many of her best men, although not generally opposed to it, regretted the domination of this power here. Yet all now indulged the hope that the day was dawning which should see, before its noon, the wooded hills and neglected valleys of West Virginia doffing their rugged garb, and putting on the robes of a thorough and expanded cultivation; and, as preliminary to this, they hailed with a welcome the coming of those who, reared and trained in the practice of active and honorable industry, should give their labor and substance to the development of the resources of their

But these hopes were of short duration. The active efforts of those o d moved to the new field of labor were only well begun when the hos- ots were fired upon Fort Sumter. There were heroes sweating and ing in the oil regions as well as elsewhere.

The promises of wealth which the oil regions had made, and which now seemed about to be realized, were forgotten. Princely fortunes lost their charms when an imperilled country called her sons to her defence, and now those who but recently came to these localities to pursue the avocations of peace, departed to practice the arts of war.

Operations on any extensive scale were now impracticable; and even if splendid results had not been impossible on account of a scarcity of laborers, the murderous raids of guerillas would have completed what the other began. A few who remained and endeavored to perpetuate what had been so well commenced labored on, notwithstanding the new difficulties. Yet the predatory incursions of guerilla bands made any large shipments of oil almost impossible. Nevertheless, despite all the obstacles thus interposed, and which were understood fully only by those who have been compelled to contend against them, there was produced at the one point of Burning Spring alone, in the year 1861, four million gallons of oil. In the year 1862 three millions two hundred thousand gallons were sent to market from this same point. The product of 1863 does not, probably, exceed two millions of gallons.

When, however, it is remembered that this large amount of oil was produced in one section alone of not over one mile square, and under circumstances the most unfavorable to production, the reader may form some idea of what might be done under circumstances that would deserve to be called auspicious.

It must not be supposed that in estimating the oil interest of West Virginia the small tract or point just named embraces the entire oil-producing district of the State. Explorations made for the discovery of oil in West Virginia, it must be remembered, had only begun three years since. The force of circumstances concentrated the efforts of explorers in the territory around this district. Oil was first discovered here in abundant quantities. People naturally flocked to this point, and before curiosity and investigation had been able to exhaust the objects of attraction here, and turn to search for new fields, the so-called secession of Virginia, with all its baneful evils, fell like a blight upon the land. While the supply from this district was diminished to some extent, other regions, unexplored, some of which are now proving as productive, remained untouched.

These territories, from which enterprise was banished by the war, remained, with all their mineral and oleaginous wealth, unrevealed, quietly awaiting the time when, without the din and perils of war, the men of toil could enter the subterraneous chambers and bring forth their treasures to the world. This period has at last arrived. Steadily the rebellious forces have been pushed and driven back until this portion of West Virginia, at least, can be said to be entirely free from them. Men begin to feel again that they are safe and secure under the old government, and with this feeling comes the revival of business. But few days have elapsed since the development of an entirely new oil district. A few months since Messrs. J. B. Blair & Co. began operating on Bull creek, and at the depth of 250 feet, on the 16th of this month, (March,) they struck a vein of oil which has continued flowing at the rate of a thousand barrels of oil per day since. A curious fact connected with the oil-beds here is the following: Commencing at Burning Spring, on the Kanawha river, we trace a belt or upheaving of the rock, causing a vein of rock some 20 feet in width to stand perpendicular on its edge, and running north one degree east, crossing Hughes river at the oil wells already spoken of; also crossing the railroad near the oil wells of Hazlet & Co., and crossing Bull creek at the wells first spoken of, Messrs. J. B. Blair & Co.'s; thence on and crossing the Ohio river, the oil district appearing to follow this upheaving, or rather this upheaving appearing to designate where oil exists. All along this line may be found gas or burning springs. As these gas springs are an excellent indication of oil, it may be safely said that oil will be discovered the entire length

this belt, thus giving West Virginia almost treble the amount of oil territory that of Pennsylvania. Already borings have commenced on and all along line; probably there will not be less than one hundred wells sunk this n at different points yet undeveloped between Burning Spring and the › river. That many will be successful cannot be doubted. Professor rs, in an able article on the history of petroleum, brought out last July, es the great basin to be near the Ohio river, in this State. Indeed, the e yield of the wells on Bull creek, five miles from the Ohio river, recently overed, would seem to be proof of this assertion. It is not intended here discuss the theory of the origin of petroleum, nor yet its composition, or ity of the several oils obtained in West Virginia. In regard to the latter, e to say they differ little from the Pennsylvania oils, a very able report of ich we have from Professor J. B. Lesley, just published. Indeed, these t oil-bearing districts differ but little in any respect, both being hilly, ey soil, well watered, and with an abundance of timber.

It will be observed that the yield of petroleum here during the year 1863 is than former years. This, however, cannot be taken as an index of the real ductiveness of the region; it may be said this is all that was brought to market. In May last the Rathbone district was, together with all the apparatus, ed and entirely destroyed by the rebel forces under General Jones. Twenty nd barrels of oil were burned with it. The losses were heavy, and, of were severely felt, both in material destroyed and time spent in rebuilding; these disasters been averted, the yield would have been equal to former years. We rejoice to believe that the day is now come when, in peace and without ance, West Virginia will be permitted to demonstrate the true extent richness of her oil districts. The wise and energetic administration of the rs of our State is beginning even now to tell in our behalf.

A infant State is a giant even in its infancy; and when once it is able to ve an undivided attention and care to its great internal interests, it will be ifest to the world that the promise of its babyhood was only a truthful gury of the prowess and splendor of riper years.

The treason which once lurked stealthily or shook its gory locks defiantly among us is now skulking to its grave. Men are daily feeling more and more that traitors are infamous, and that loyalty and honorable industry are the est elements of power and progress; and we venture to affirm that when, the effects of a general education and a wise and energetic government, State of West Virginia fairly begins her course, she will take rank high up far forward among her noble sisters, and will have no cause to blush when e looks at the emblems which betoken the sources of her power. When her neral wealth begins to be developed, when her reservoirs of oil, her vast ls of coal, lead, and iron ore have become known in their true character, n her facilities for refining these articles are known, and all her resources producing have been unfolded in their full proportion, we think her sister es will not be reluctant to award honor and admiration and warm welcome ue star that last began to shine in our national constellation.

Oil is brought to Parkersburg, the general oil market of the State, from ing Spring during the spring and fall, by flatboats on the Kanawha r at a cost of seventy-five cents per barrel; other seasons, when the river ot navigable, it is wagoned at a cost of two dollars per barrel. It is well nention here that a bill has recently passed the Virginia legislature for the im- ement of this river. A company has already been formed, sufficient stock sub- ed, and we may expect that soon the Kanawha will be navigable all the year. om Hughes river and Petroleum districts the oil is hauled to points on the western Virginia railroad at a cost of twenty-five to fifty cents per barrel, rom Bull creek it is hauled to the Ohio river at a cost of fifty cents per barrel.

THE ITALIAN HONEY-BEE;

OR THE

CULTURE AND ITALIANIZATION OF THE NATIVE OR BLACK HONEY-BEE.

BY RICHARD COLVIN, BALTIMORE, MARYLAND.

THE first attempt to import the Italian honey-bee into the United States, it is believed, was made about the year 1855, by Messrs. Samuel Wagner and Edward Jessop, of York, Pennsylvania; but, in consequence of inadequate provision for their safety on so long a voyage, they perished before their arrival.

In the winter of 1858–'59 another attempt was made by Mr. Wagner, Rev. L. L. Langstroth, and myself. The order was placed in the hands of the surgeon of the steamer, (to whose charge the bees were to have been committed on the return voyage,) with instructions to transmit it to Mr. Dzierzon on reaching Liverpool; but, in consequence of his determining to leave the ship to engage in other service on his arrival at Bremen, it was not done, and this effort failed. Subsequently arrangements were made by which, in the latter part of that year, we received seven living queens. At the same time, and on board the same steamer, Mr. P. J. Mahan, of Philadelphia, brought one or more queens, which were supposed to be of doubtful purity. Only two or three young queens were reared by us during that fall and winter, and in the following spring we found all our imported stock had perished.

In conjunction with Mr. Wagner I determined to make another trial, another order was immediately despatched. The queens, however, did not arrive until the following June. Meantime, about the month of May, Mr. S. B. Parsons, of Flushing, Long Island, received an importation of them from northern part of Italy, some of the progeny of which he placed in the hands of the Rev. L. L. Langstroth, Mr. W. W. Carey, Mr. M. Quimby, and other skilful apiarians, who, with Mr. C. W. Rose, a subsequent importer, and perhaps some others, have bred and disseminated them pretty widely through the country.

In consequence of a severe attack of illness in the latter part of the summer of 1860 I was unable to accomplish much beyond the rearing of some fifteen or twenty queens, which were impregnated with native drones. Aware that European breeders had found difficulty in breeding them pure, and learning that similar difficulties seemed to be encountered by those breeding them in this country, I determined, before disposing of any queens, to Italianize my entire apiary from the purest stock to be procured, and accordingly made subsequent importations from the most reliable sources, including the vicinity of Lake Como. None, however, excelled, if equalled, those procured from Mr. Dzierzon, from whose stock my present Italian apiary has been bred.

As the natural history and cultivation of this race of bees does not, in general, materially vary from that of our native bee, (and a detailed account of it would be too lengthy for this article, and has already been published in the excellent work of Rev. L. L. Langstroth, entitled "Langstroth on the Honey-Bee,") I

hall state simply such leading facts of their general history as may seem necessary for a clear understanding of the particular subjects upon which it is proed to treat.

A colony or hive of bees in its normal condition, during the honey season, ains three kinds of bees, viz: "The queen," "workers," and "drones." In ıdition to these, under certain other conditions, there sometimes exists another nd called "fertile workers," of which I shall speak hereafter.

The queen is the only fully developed female in the hive. She is impregted but once, copulating with the drone on the wing and high up in the air, rhich, if delayed beyond three weeks after she is hatched, she remains unimnated for life, producing drone eggs only. She is capable of laying two ıusand or more eggs in twenty-four hours. She has a sting, but uses it only in lly conflict with another queen. She lives to the age of four or five years. nen she begins to show evidence of decrepitude her "workers" rear another take her place, and both are tolerated and protected by the workers in the e until the young queen becomes fecundated and capable of filling the duties her ancestor.

The drones are the male bees. They have no sting, are not provided with means suitable for gathering honey or secreting wax, and except that by heat of their bodies they aid in rearing brood, they appear to have no duties perform except the impregnation of the queen, which instantly causes the death the copulating drone. Their numbers depend greatly upon the quantity of "drone comb," (which is composed of larger cells than the "worker comb,") ch is contained in the hive. They have no sting, and unless the colony is ıueenless, are destroyed by the workers as soon as the honey harvest has passed l swarming ceased.

The workers are females, whose ovaries are so imperfectly developed as to apacitate them for laying eggs. They gather the honey, build the combs, hatch l nurse the young, raise queens, and perform generally the laborious duties ır the hive. They are seldom able to sting more than once, as the sting reıs fastened by its barbs in the wound, and being, with its poison-sack, awn from the abdomen of the bee, soon causes its death.

By puffing smoke into their hives, or keeping them in a state of great alarm twenty or thirty minutes, they will gorge themselves with honey, and be- ıe perfectly good-natured and harmless, unless squeezed or hurt, and may ın be handled with perfect impunity. During the honey harvest, when their ıors are constant and heavy, they often die within three or four months; but se bred later in the summer and fall, when the honey season is passed, and ıose labors are light, survive until the following May or June. Usually the en will lay only as many eggs at a time as her colony of workers are capaı of hatching and feeding. Should she exceed this number, however, the rkers have a convenient method of correcting her mistake by eating the ex-

The eggs are hatched by the heat of the bodies of the mature bees, the workers of which also feed and nurse them until mature—the queens requiring teen, the workers twenty-one, and drones twenty-four days, for their full velopment, counting from the time the egg is laid. A low degree of temature in the hive may lengthen these periods a day or two, and a very high rature, on the contrary, may shorten it a day.

ew, if any, bees are bred in the latitude of the northern and middle States reen the first day of November and the following February, during which y, having reached their appointed time, die, while others perish from exe to cold and other causes; thus often reducing their numbers one-half w the first and last periods, at which time the queen again resumes her l , and continues it, to a greater or less extent, until the following October ber.

As soon as the hive becomes densely populated, if the honey p i
bountiful in its supplies, the workers rear a young queen or queens, at
turity of the first of which the old queen leaves the hive, followed by a
of the workers of all ages above two weeks, and "swarms;" but "swar
(not desertion of the hives,) seldom if ever takes place except under the follo
conditions: A populous colony; a mature young queen, almost if not q
ready to emerge from her cell; a bountiful supply of honey pastu
clear weather.

As the workers frequently commence the rearing of a dozen or more q
when they prepare for swarming, which queens mature at different
or on different days, they are often led to swarm to excess, by which
stock, as well as the later swarms, are rendered worthless. When the
old queen takes out the first swarm, she leaves behind her a young q
which, under the most favorable circumstances, seldom commences to la
at least the eighth day after the old one has left. Meantime a large num
young bees and another queen may be hatched, and before the first
queen has laid any eggs, she may carry off the second swarm, and so also
third, and sometimes, though rarely in this section of the country, a fourth, by
which time (no eggs having been laid in the interim) *all* the brood is hatched,
and nearly all has been "swarmed out," the last one, or, perhaps, the last two
swarms, being so small, and *so late* as to be unable to build comb and lay up
sufficient stores for their winter support, and the parent hive with an inadequate
number of bees to either protect its combs from moth or produce a sufficient
stock of bees or honey for their sustenance the following winter. This presents
one extreme. The opposite is where (although the colony is populous) no
swarming takes place, and the bees seem to hang listlessly around a hive filled
with honey. This may, and often does, occur in consequence of an excess of
honey in the hive in the spring, which prevents the rearing of large numbers
of bees at one brood. They gradually, perhaps, become populous, and, during
the same time, by filling the cells with honey as soon as made vacant by the hatching
of the young bees, they arrive at a stage in which there is very little room for
breeding or further increasing their number, and having no room in the hive in
which to store any surplus honey, listlessly do nothing. This condition is also
sometimes produced in consequence of inclement weather setting in just at the
time they are about ready to swarm, and continuing until all the young queens
have been destroyed, and a very large number of workers hatched, which, before
young queens can again be reared, on the return of fair weather, fill the
brood cells, or most of them, with honey as fast as the young bees in them
emerge, and thus bring about that "opulent" condition which disinclines them
to swarming, as in this condition but few more bees can be bred that season.
Such colonies are very apt to enter the winter with a greatly diminished population
of old bees, many of which must die before spring, besides those chilled
to death between these thick, cold walls of honey.

Such stocks are likely to prove the least productive in the apiary, so long
as burdened with the excess of honey, and afterwards, until they have had
time and season to recover.

When the combs in such colonies are movable, of course the seasonable exchange
of a few empty frames or combs for those they have filled with honey
will at once enable them to resume breeding, and by the timely provision to
populous colonies of suitable surplus honey receptacles, (each having a small
piece or pieces of new comb attached by means of melted wax, or otherwise, to
the underside of its top, as an inducement to commence,) they will store surplus
honey in these receptacles, thereby leaving those in the brood chamber at the
disposition of the queen for breeding purposes.

The difficulty of inducing them to work in these surp
is greatly obviated by placing them over the brood ch

'honey-board" or intervening partition between them and the brood chamber. successful remedy for preventing the queen from going up into the recepples to deposit eggs, and the consequent storage of pollen therein by the rkers, thereby injuring the quality and appearance of the surplus honey, may found in using movable frames in sections, or otherwise, made about one l one-half inch in breadth on their tops, and placing between these frames inn perforated partitions, or comb guides. The space thus allowed for the combs being too thick for one brood comb, and too thin for two, the workers build but one, the cells of which, being too deep for brood cells, present, together with the presence of the comb guides, such uninviting quarters for her royal ladyship that, in the storage of over a ton of honey in such receptacles, I have not had a single instance of egg-laying in receptacles thus arranged. The frames or sections may be made of such size as to contain any desired quantity of honey within their capacity. If several sections are used in one frame they should be made to fit exactly, and without grooves, so that they may be easily and quickly removed by a little pressure. As queens seem to possess an inveterate hatred toward each other, and seldom both separate alive when they meet, the workers are compelled to guard the cells of the young queens, during the time they are being reared, against the attacks of the old queen; and I have often seen her driven hastily away when she attempted to approach them. Under these circumstances it would seem most unnatural that she should deposit an egg in a queen cell; and although several distinguished European apiarians take the opposite view, and assert it as impracticable for the workers to take an egg or young grub from a worker cell and transfer it to a queen cell, I have witnessed so many instances of their having done so that there can no longer be any doubt upon this point. One of my imported Italian queens this summer gave some evidences of infirmity, and although the colony was not in a condition to swarm, at least eight or ten young queens have been, at different periods, reared by the workers in her hive. One of these queen cells was constructed upon the outside combs which *were filled with honey*, and where no other eggs were or had been laid during the season, and where the queen would not be likely to go, or to find the cell. The same precaution, but in a less striking degree, was exercised by them with two others of the queen cells. On two occasions I found the young queens hatched, and one of them had evidently been "out" at least three or four days, yet both the old and young queens were being treated with the kindness and attention with which queens are usually treated by the workers. Late in the month of August the queen deposited some three hundred drone eggs in drone cells, at a period when colonies with younger queens were destroying them, indicating clearly their preparations to meet the contingency of her early and final exit. The carrying of eggs and grub from one cell to another is an important fact to be noticed in the rearing of Italian queens, of which I shall hereafter speak.

When a colony is deprived of its queen the workers will build none but drone or store combs until they are again possessed of one, and they not unfrequently build a large excess of drone combs in the brood chamber of their hives when possessed of a queen, which, as she never deposits any but drone eggs in them, is productive of the most injurious effects so long as it is allowed to remain there. In the early part of the season, or until about the first or middle of April, queens will seldom deposit drone eggs; but as soon as their pasturage begins to yield a bountiful supply of honey, they commence laying them, and then lay eggs in each and every consecutive comb and cell (whether drone or worker) within the compass that their workers can keep warm, or hatch, and continue to do so until the honey pasturage begins to decline, which is, here, generally about the first of July, when they will again discard the drone egg-laying. Meantime, however, if there has been a great excess of drones in the brood chamber, the drone progeny, (being only consumers,) often upon their exit, leave too

little honey to sustain the colony the following winter. If the space occ by these drone combs had been occupied by worker combs there w l been producers reared instead of consumers, which would, of course, have changed the quantity of its product, and saved it from the danger of s There are very few hives which do not contain a greater or less exc kind of comb, by which the quantity of surplus honey which might be duced in our country is greatly lessened. Control of the combs, of co enables the bee-keeper to remedy this evil.

For various important reasons *colonies should at all times be kept po* It is only by the *united heat of large numbers* of bees clustering closely in their hive that they are enabled, without extra care, to withstand the of the winters in our middle, western, and northern States. Hives thick boards possess but little, if any, advantage for their protection. A experiment on this point I had two hives constructed of pine lumber, the b of one only one-eighth of an inch in thickness, and those of the other one- of an inch thick. They were Langstroth's movable comb hives, but the corners to give sufficient strength and retain their shape. A po colony, sufficiently provisioned, was placed in each last fall. They the open air without any shelter whatever, except their hive, and on exa them in the spring they were in as good, if not better, condition than colonies in similar hives made of boards an inch thick, and placed on the bench with like exposure. During the three intensely cold days in the of January, six less populous colonies in hives made of thick lumber pe from the cold, which was very severe. The advantage of populous col this respect is obvious; nor does it stop here. Where colonies are popu during winter, they not only consume proportionately less honey, but *mence breeding much earlier in the spring*, rearing *larger numbers at each brood*, and *filling their hive with bees by the time the honey-producing flowers bloom*. They also throw off large swarms early in the season, which, having nearly the entire honey harvest before them, are enabled frequently, not only to lay up an abundance for their own support the following winter, but furnish their owner with a liberal surplus, while the present stock has also ample time and opportunity, before the end of the honey harvest, to lay up large stores of honey. Colonies kept constantly populous bid defiance to the bee-moth, as well as other enemies; require far less care and attention from their owner; and from them alone are his profits realized. To secure in perpetuity this desirable object the bee-keeper must understand the subject fully, and be able to avail himself of the advantages furnished by the movable comb system of bee-keeping, for without it he often cannot ascertain the existence of evils in season to remedy them, or remedy them if he did. With it this is but the work of a few minutes, and possessing full control of their combs he can administer the "ounce of preventive" in a most admirable manner; can increase, diminish, or keep stationary the number of his colonies at will, and provide properly for all their requirements with the least possible trouble and inconvenience. In illustration of this I will answer a question which has been asked me probably more than one hundred times: Why did my bees die last winter—the hive was full of honey? The anxious inquirer has unconsciously answered his own question. "The hive was full of honey," and the bees, compelled to cluster in *the sheets between thick, cold walls of honey*, which their animal heat was inadequate to warm, had frozen to death. Another late swarm, perhaps, standing by its side, had starved to death in and between empty combs. The simple exchange of a few full for a few empty combs between these two colonies would have saved both, and placed them in their best condition for breeding in early spring, for it must not be lost sight of that the colony in which the combs are *all filled* with honey has no room for breeding, while the other would have nothing to feed the young, if bred, until it would be furnished by

flowers, which may not bloom before the following May. Colonies, ı
ularly weak ones, which are thus retarded in breeding during the early
of the season, cannot become populous until much of the honey harvest
if not entirely over, and then, failing to secure a sufficient "winter
y, perish of hunger, or desert their hives, and in attempting to enter
are often stung to death. By simply giving such a weak stock, early
ng, one or two combs of honey and *nearly matured brood* from a populous
in exchange for as many *empty* combs, the weak colony can, in a few
, be made so populous as to give full scope to the laying powers of its
and become densely populated by the time the honey harvest opens in
ring. The moth, which is generally regarded as the greatest enemy
bee culture, seldom attacks, and never successfully overcomes, a populous
. In a large majority of cases where they have done so the cause has
the loss of the queen. This loss can seldom be ascertained in other hives
the work is so far accomplished as to be irrecoverable, while, with the
the movable comb hive, it, as well as the intelligent and seasonable ap-
on of the proper remedy, is but the work of a few minutes. These are
a few of the many vitally important advantages which the Rev. L. L.
th has contributed to the bee culture by the invention of his admirable

DESCRIPTION OF THE ITALIAN BEE.

The Italian honey-bee differs from our native or black bee in color, size, tem-
it, productiveness, industry, and power of endurance.

THE QUEEN.

The abdomen of the queen is somewhat more lengthy than that of the native
en. The abdominal rings of the Italian queens do not possess like degrees
orilliancy of color. Whether this is the result of accident, or otherwise, I
e as yet been unable definitely to determine, but have noticed that the
er colors (which are few) are more frequently bred in the old dark-colored
s than in new. The bright or standard color of the queens, when first
hed, is of a yellowish or straw color, commencing at the waist and extend-
nearly to the lower extremity of her abdomen, which is of a dark chestnut
n color, the yellow, as it approaches the three lower abdominal rings,
ually blending in the brown; the lower edges of the four uppermost yellow
rings sometimes having a very narrow bordering of darker shade
the balance. When first hatched they are long and slender, but in the
e of four or five days the abdomen contracts in length, and frequently
ts a rusty brownish appearance until two or three days after impregna-
when the abdomen becomes gradually elongated and somewhat distended,
s a somewhat darker shade of its original bright color. Subsequent
s or age slightly increases the dark shade of coloring. When she ceases
ng in the fall or winter her abdomen again contracts, its length resembling
hat its size and shape prior to impregnation.

THE DRONES

much more in color. On some the only perceptible difference between
the native drone is a slightly lighter shade in the narrow border on
r edges of their abdominal rings. While the upper half of the abdomen
will be entirely of a rich yellow or orange color, others are spotted,
I have seen which were almost entirely of a whitish yellow, inter-
with spots of a brownish color. In shape and size they resemble our

"THE WORKER."

The abdomen of the Italian worker bee is somewhat longer than t t of native. This is more perceptible when it is gorged with honey or re) its hive heavily laden with honey. The lower extremity of the abu s also more slenderly pointed, which, together with its rich coloring, gives it a more graceful and elegant appearance. The three first abdominal rings (in- cluding the one joined to the waist) are of a beautiful yellow or straw color. The second and third, and sometimes the first, of these rings or bands are with a narrow border of dark brown or black. The first does not always extend entirely across on the back of the bee, and is very slender, each succe one slightly increasing in breadth. Queens which breed any worl s less number of yellow abdominal rings than three, are assuredly not pu they have the full number of yellowish bands, and those bands are or s cast and black, bordering unusually wide, it is, at least, an indication or o ful purity. It not unfrequently occurs that queens three-fourths pure, brea workers all, or nearly all, thus marked. The temperament of the pure l bee is exceedingly gentle. They not only rarely offer to sting, but manifest any anger. Though their hives be opened from day to day s season through, the same docility is manifested by pure colonies as when o only a few times during the season, so that this is unquestionably an inne characteristic. When they do sting, however, it is done with the gr imaginable determination and force. Any amalgamation between the Italian and native bee destroys their docility, and an equal-bred hybrid, or lower grade of cross between them, is often terrifically ferocious and intractable when greatly aggravated. I have been stung by them with such ferocity that the stinging bee expired in the very act, its abdomen curling up as if itself stung. I can account for this only upon the supposition that, in consequence of the violence of its anger or of the exercise of its force in stinging, its poison-sack is ruptured within it, producing instant death, as its contortion is precisely similar to that which follows when it has been stung by another bee, which produces certain, but not always *instant*, death. Nothing arouses the anger of bees quicker or to a greater degree than the smell of this poison. Hence, when stung, the sting should be immediately extracted from the wound, and all the odor of poison destroyed by washing, or otherwise.

The native honey-bee cannot resist partaking of honey or liquid sweets when offered to it, and will gorge itself with them in a few minutes, no matter how angry it may have been at the time of their presentation. Not so with the greatly enraged hybrid, intent upon vengeance. It pays no regard whatever to them, though offered a dozen times; nor will smoke itself always prove efficacious in subduing it under such circumstances, unless it be confined to its hive and the smoke forced in to such a degree of density as to endanger their lives from suffocation. Kept in this condition for half an hour they will be found somewhat subdued; often, however, a few minutes' breathing of fresh air restores their former vindictiveness, and they resume its manifestation with renewed vigor; and, though gorged with honey, it does not seem to abate it a particle. Once thoroughly enraged, these degenerates seem to remember it the entire season. In fact, I had one colony which resumed their "sharp practice" in the spring of the following season. There is, however, a great difference in the temperament of different colonies of the impure race, some of the higher Italian grades manifesting much of the gentleness of the pure race. The physical strength and courage of the Italian bee is greater than that of the native, which it speedily overcomes in either single combat or battle array. A colony of native bees, once attacked by an Italian colony of nearly equal numbers, cannot successfully resist them, and soon becomse its prey, unless timely succor be extended to it. They are by no means conscientious on this

int. As soon as they can no longer procure honey from the flowers, they be found lurking about in search of weak or defenceless colonies, which y soon destroy if permitted. Still, however, so long as the honey harvest unds they seem not to think of robbing. May we not, therefore, attribute so their *excessive industry*? for in this they also excel, working both later in evening and earlier in the morning, as well as much later in the season, the native bee. Our honey harvest usually, in this section of country, minates about the middle of July. Last year I found them building combs storing surplus honey during a great part of August and September. They tless obtained it from some source unfrequented by the native bee, as the ter were at that time consuming the honey they had previously gathered. queens continue to lay in the summer and fall, so long as their workers con- e to obtain supplies of honey from abroad, they of course breed later in the n than the native bee. This is of vastly great advantage in sections of try where they are compelled by cold to lie dormant so great a part of the r. As they seldom swarm late in the season, the bees bred at this period le the colony to enter the winter with a large population of *young* bees, the er portion of which survive until one or two numerous broods have been ched in the following spring, and the colony prepared in numbers to swarm, well as in every other respect to avail themselves of all the benefits of the y harvest the moment it presents itself. To this fact, and their great powers of endurance, I attribute much of their productiveness. There is, however, one other most striking feature which, doubtless, is greatly contributive to it. I allude to the rapidity of their breeding. As soon as the weather becomes sufficiently warm in the spring to prevent the chilling of their more hardy brood, if you will open the hive and examine their combs you will find entire sheets of it filled with young in process of maturation, all attended by a few scattering bees, presenting almost the appearance of a deserted colony. This enables them to far outstrip native colonies of like size in building up a strong population *early in the season*, which is vital to their prosperity; for, if the bees are hatched and ready to enter upon their work as soon as the harvest presents itself, all that can be done may be and will; but (as is the case, probably, in six-tenths of all stocks of native bees) if not hatched until the harvest is one-half or more passed, of course much is lost; and when we consider that, in the greater part of the country lying north of Mason and Dixon's line, the honey harvest lasts only about two months, during portions of which the bees are kept in their hives and their pasturage rendered barren by rains, it will be seen that a few days of *favorable* weather is to them an item of no inconsiderable importance. I have had in a period of two weeks, at the height of the honey harvest, nearly thirty-five pounds of honey stored in surplus honey receptacles, besides building the combs in which they stored it, which, as they consume about twenty pounds of honey in secreting the wax used in constructing one pound of combs, would be equivalent to about seventy pounds of honey gathered by a single colony in two weeks. The great redeeming point in the character of the hybrids is that they possess much of the fertility, industry, and productiveness of the pure race. Their stinging propensities, however, in connexion with the fact that they are likely to degenerate rapidly and return to the habits of the natives, will prevent their becoming favorites, aside from other objections which will be found hereinafter.

BREEDING.

It is indispensable, or at least of the utmost importance, that those who attempt to breed the Italian bee purely should familiarize themselves with the appearance and character of the pure race, in order to detect degeneracy before it has reached a point at which it may cost them much trouble and care to

remedy it. Of course, the nearer pure the impure becomes, the more
the detection of the impurity; and bees, like animals in this respect,
"take sides" in breeding—so much so that I have had hybrid stock
none but an expert could have distinguished by their markings from
has been generally supposed in this country that queens were pure wh
duced workers the first three abdominal rings below the waist of wh
of a yellowish or straw color, with a black edging or border. This t
however, cannot with safety be depended upon. Queens which are three-
or nearer pure, not unfrequently produce workers thus marked; but if
are bred from the eggs of such tainted queens, they or their immediate
will almost invariably, by their *markings*, discover their impurity. Thi
of testing has been adopted by the Rev. Mr. Kleine and other distingui
pean apiarians as the only one upon which entire reliance can be plac
trouble, expense, and time required to apply it, however, renders it para
objectionable to breeders, who are exceedingly anxious that the country
be supplied with queens in the shortest possible time within which they
produced, regardless of a little impurity, which may cost the purcha
of care and trouble to eradicate after he has procured a pure queen;
is exceedingly desirable, both to breeders and purchasers, that some otl
more readily accessible should be furnished. This has already been
least approximately; but as yet I have not seen it so clearly describea
enable a novice to readily and fully distinguish it without having pre
seen pure Italian bees. This test is their extreme docility, perfect comp
and quietness when being handled, or under circumstances which would g
excite and irritate the native or hybrid. One of the chief recommenda
this bee, which was heralded to the American people on its introduction,
extreme docility, even under great provocation, and I frankly confess tha
years of their cultivation, coupled with constant series of experiments during
period, has with me fully confirmed this repute of their character; and I
been greatly surprised to learn, through the agricultural prints and
sources, that Mr. Quimby and some other skilful apiarians cannot agree
me upon this point. Out of probably six to eight hundred queens that I
reared, not one of reliable purity has failed upon this point. So unifo
invariably is this the case that I should, without hesitation, condemn as
any stock, whatever its markings, which did not possess this cha
less by oft-repeated and excessive annoyance their anger had be g y
repeatedly provoked.

On lifting the combs covered by pure Italian workers out of the hive, scarcely any of them will leave it, nor show any indications of anger or discomposure, beyond a careful watchfulness against the encroachments of robbers and protection to their queen, brood, and honey. Another peculiarity is the great tenacity with which they cling to their combs. In a few instances, where the combs have been filled with honey, I have actually shaken the frames to pieces without being able to dislodge all the bees. Colonies which closely approximate purity possess, in some degree, these peculiarities; hence the necessity for persons who propose to breed these bees, to first familiarize themselves with these peculiarities by visiting an apiary of undoubted purity.

ITALIANIZING AN APIARY.

This is done by rearing queens from the eggs of the pure Italian queen, removing the native queen from her hive, and substituting the Italian in her place and stead.

REARING QUEENS.

This process is greatly facilitated by the use of the movable comb hive; indeed, without its use I should almost despair of success in Italianizing an

y of even moderate size. There are so many circumstances attending this
which require frequent examinations and a perfect knowledge of what
ring in the hive, that their use is almost if not absolutely indispensable
s. I shall therefore assume it in this article. The same egg which
the worker bee, and as such is *twenty-one* days in maturing, is, through
y of nutritious food and other operations of the workers, converted
ue in *sixteen*. The process of its conversion must be commenced,
l ore the egg has reached the end of its sixth day's age, unless, as
u though rarely the case, its hatching and development are retarded.
e or those which have remained in the hive over winter, will seldom
queens; it is therefore necessary to use those recently hatched for the
se.

not necessary to employ an entire colony full size; a nucleus of a quart
of young bees with three or more combs will answer the purpose even
the time consumed in examinations is thereby lessened, and a great
enected. They are better protected, and in some respects more con-
le, by being placed in a small hive to suit the size of the nucleus; but I
sometimes partitioned off a Langstroth hive into three apartments, and
a apartment for a separate nucleus with tolerable success. The par-
wever, should entirely separate apartments, and prevent communica-
tween them. As bees which have once flown from the hive will, if re-
but a short distance, on flying out again, return to the same spot where
ive formerly stood, it is very useful, in extensive breeding, to have two
or localities for keeping them, a mile or more apart. By this means
may be formed in one, which, on being removed to the other, are unable
their way back, and therefore adhere to their new locality. Bees which
never flown from their hive do not require this precaution, as but one
queen is tolerated in each hive, except in case of preparation for
ing; and bees, so long as possessed of a queen, will not rear another.
nuclei for rearing queens must be made queenless, and deprived of all
containing native eggs which have not been laid longer than six days.
should then be furnished with a comb, or piece of comb, containing the
of a pure Italian queen, which if not abundant, the comb containing them
be cut into strips three-fourths of an inch in width by about six inches in
, and this strip inserted into a frame of comb, the strip resting horizontally
ings of half an inch at its ends, with an open space cut out between
ings, and under the strip containing the eggs, an inch in breadth. The
will generally so distribute the queen's cells along the length, and at the
ge of the strip of comb containing the eggs, as to admit of their bei
without much loss. The comb containing the eggs should
ween two others, containing a sufficiency of honey and pollen
y their wants. These combs, however, should contain no
ough to be convertible into queens; oth rise the
ive or impure eggs or grub for queens, and r the
only. This is the more important from the t
r eggs and grub from one cell to another, or from to a q
They may therefore take an impure egg or grul i
constructed upon the comb containing the pur , reau use
to suppose it pure; and should it be nearly ce a progeny
ly distinguishable from the pure race, it of intro-
impurity into the apiary, which, failing over, y be so
disseminated through it as to requir h t care, abor, and
icate it.
ination of large numbers of impu q s whi l al r
n this country will be productive of n m t
er be lost sight of that, although a

reared from a pure Italian egg, but impregnated b
drone, may be pure Italian, (which is now consid
as many American breeders, as an established fact
progeny which a pure virgin queen thus impregnat
and that, should she die, and another queen be rea
the hybridized mother, without the knowledge of th
be impregnated by a pure Italian drone, she woul
whatever, though it might closely resemble it; a
such a queen into an apiary, incalculable mischi
follow.

The bees will generally construct upon such a s
or twelve queen cells, frequently by enlarging
them, thus enlarged, vertically downward in the s
strip. The queen cells vary in length from three-e
three-eighths inch, and resemble small teats, much
small peanut shell. Each shell contains a singl
first of them is hatched she proceeds to destroy al
or inciting the workers to tear open, their cells, w
death and the workers drag them out of the hive.
may be hatched on the *ninth* or *tenth* day after th
given to the nucleus to rear them from, it becomes
all but the first hatched from destruction, on the *n*
queenless nucleus or miniature colony for the rec
queens, and to cut out all except one of them, dist
each nucleus by cutting an aperture in one of its
cell into it. Great care is required in performin
prevent the young queen from being injured or de
at that time be found to have just changed into
of development, when they are so tender that a sli
exposure to the cool air, may destroy their vitality.
distributed to colonies which have but recently be
and still have eggs or grub young enough to be
not unfrequently destroy the transferred one, even
and in some instances I have had them to continu
any material for young queens left. In such c
ceive a hatched or mature queen; but in others
receive any, but in that case will occasionally r
which may be furnished them immediately after
from age ceased to be convertible into queens.
they will, for a time, refuse to receive or rear all a
is the case, it is best to break it up and unite it t
and contrary nuclei are apt to become infested wi
while they resemble the ordinary worker bee, are
produce *drones only*. In rearing queens the wor
feeding a number of the worker larvæ for two or
jelly, (upon which embyro queens are fed as if in
queens,) suddenly cease to supply a portion of the
supply them with such food only as is used in the
worker bee, completing their development as such.

It has been supposed by Huber, and other disti
royal food which they for a time enjoy produces t
enable them to perform this queenly function.
laying thousands of eggs in drone and worker cell
depositing a dozen or more in a single cell. Th
abundantly at the season when colonies containing
their drones, and where they happen to be impure,

often productive of great annoyance and mischief in Italianizing an apiary, their progeny sometimes far outnumber the pure Italian drones then living. young queens, matured during their existence, are likely to be impregnated them. They are the more obnoxious from the fact that, where their progeny arly pure, the mischief they create may not be discovered in the first gen- ion, and its consequences may become so widely spread in the apiary as to uire great watchfulness and careful pruning, for a considerable time, to eradi- it. Inasmuch as they can seldom be distinguished by their appearance m the ordinary worker, and are rarely to be caught in the act of laying, it is t to impossible to discover and remove them but by furnishing the nucleus h a fertile queen, or uniting it to a colony which has such an one. The lay- generally ceases. Whether or not they are then destroyed I have not yet able to discover. But to return to our young queens. Occasionally some nose which are not destroyed, and come to maturity, are found to be defect- , generally, in the wings, sometimes having only one, or none at all. As ens copulate with the drones only on the wing and in the air, all such de- ve queens are of course worthless, except as "drone-layers," and, unless ted as such, should at once be removed, and their places supplied by other d queens, or eggs, for the purpose of rearing them. The young queens, ch mature perfect if favored with warm and fair weather, and drones are ndant, generally leave their hives to copulate with the drone on the *seventh* y after they are hatched, and on the following day, if impregnated, they com- ce laying.

From the period of hatching to that of impregnation, which, in favorable weather, is generally from seven to fourteen days, many young queens are lost, or perish from various causes, a few of which it may be well to enumerate. They may be caught by the bee martin; become exhausted, fall to the ground, come chilled, or, from exhaustion, be unable again to rise; their wings being ort, sometimes when she flies out the workers follow her, as in swarming, and all desert their home together; at others they attempt to enter another hive, and are stung to death by its inmates. Occasionally, when all return to their own domicile, the workers, as if displeased with the procedure, seize their queen, and, forming themselves into a knot, squeeze her to death. I am by no means confident that this affectionate embrace springs from maternal affection; still they might sting her to death in a moment, while I have known them to be engaged in this hugging process for three successive days together, and the queen still living, while in other cases they will continue to hug her carcass for several hours after life has become extinct. As soon as they discover her decease they drag her to the entrance and cast her out of the hive.

After impregnation has taken place, and she has safely returned to her hive, losses are comparatively few, unless the nucleus hive or colony be too small to satisfy her prolific demands, when she will disencumber herself of eggs by depositing them on the edges, or in large numbers in the cells, and then desert and seek a wider field for her operations by entering, or attempting to enter, another hive, in which effort she generally perishes. At other times, in such small nucleus hives, the population becomes too dense for comfort, and they "swarm." Usually, however, in such cases, as in starving, it is rather a desertion than swarming, as no queen cells or workers remain behind. I have found it very convenient and safe to use a small hive made on the Langstroth movable comb principle, large enough to accommodate three or four combs of full size. When they become too densely populated I divide them, or rob them of brood before hatched, in order to prevent it. Where they chance to become too weak I furnish them brood from other hives; so also with honey, thus keeping them in proper condition for my purposes. Where persons are Italianizing their own apiaries only, and would have no further use for small or nucleus hives afterward, they may either partition off a "Langstroth" hive

nto three apartments, as before mentioned, using each apartment for a nucleus, or, consenting to encounter the loss in honey and brood co upon the colony's being queenless for a time, and the trouble of ch their entire colonies, they may abstract the native queens and intr Italian queen in a *sealed state*, taking care that she passes safely th the subsequent casualties to which she may be exposed.

The advantage of this method is that the risk of *safe introduction* i colonies is encountered *before much time has been expended upon them;* lost, her loss is comparatively small, though at the height of the bree honey seasons it is not so insignificant to the colony's prosperity.

In all cases where the young queens become impregnated by the impure Italian drones they should be supplanted by others, as speedily sible, reared from Italian eggs of unquestionable purity; and this pre process should be repeated until every colony in the apiary is supplied queen of undoubted purity. A most singular peculiarity of some of Italian queens is that, during the first few days after their impregnat place, they lay none but drone eggs, often depositing them in "worl a blunder which she never after unconsciously commits until she al vanced age.

The power of laying either kind of eggs seems, too, entirely under of her own volition. Where a hive is deprived of all its drone combs, an tirely *filled* with worker combs, if the season for swarming has arrived colony has become populous, as a last resort in preparing for the impre of her successor she will lay drone eggs in worker cells. The worl also, in such an emergency, sometimes by enlarging a few worker cells, them into drone cells. The worker cell is only one-fifth of an inch in d while that of the drone is one-fourth of an inch. Repeated examinati failed to discover any difference between the respective sizes of the cells of the Italian bee and those of the native beyond the variation to b in different combs of our native bee.

INTRODUCING QUEENS.

The worker bees manifest great affection for their queen. I have more once been stung by them. When catching or holding her she would u cry of distress. When deprived of her they manifest the greatest sorrow anxiety for her recovery, yet, on hastily returning her an hour or I I have seen them, in some cases, instantly sting her to death. The this singular and most unnatural treatment was for some time a m y; after repeated experiments I became convinced that it was owing g ay to manner of presentation, and the temper of the recipients when she sented. Subsequent experiments have confirmed this opinion. The bee is exceedingly watchful and impulsive. The slightest quick motion and excites it for an attack, and if, when in this condition, one of its own workers alights suddenly near it she is liable to be seized, and I have so seen her stung to death before the mistake was discovered. Once excu combat, they seem completely abandoned to the destruction of the ob their attack; and although they quickly recognize the scent of a queen, under the impulse of angry excitement, they do not often stop short of destruction. The knowledge of these facts has led to the adoption of var expedients for the safe introduction of queens. As these processes n be safely and conveniently accomplished with the use of the movable f invented by the Rev. L. L. Langstroth, (by which I have been greatly a I shall, in explaining them, assume its use.

The first, and probably safest, mode which I shall describe is fol the morning of a pleasant day, when the bees are flying freely,

most populous hives four or five combs containing honey and nearly mature brood. Shake from them, into their own hive, the old or hatched bees, hang the combs properly into an empty hive, which should then be carefully closed so as to prevent the escape of the Italian queen, which should then placed in it by opening one of the holes in the honey-board over where the combs are hung, and dropping her through it on the top of a comb. Then close the board, and, after removing the before-mentioned populous colony from and to another at some distance, place the hive containing the Italian queen the stand from which the other was removed, and partially open its entrance. bees which have been out gathering honey, on returning to the accustomed spot, will enter the hive containing the Italian queen. Gorged with honey, exhausted by the fatigue of a long flight, disconcerted by the apparent desertion which has taken place during their absence, and not knowing where to find their original hive, they will at once adopt the new home and queen.

If this operation is performed between the first of May and middle of June, filling the empty space left in both hives with empty frames, two colonies be formed of the one, which is one method of performing what is called artificial swarming." But if it be done after this period, and when the scarcity of honey pasturage would render it unwise or unsafe to form a new colony, then the native queen should at once be abstracted from her colony, and few hours later, when the workers have discovered their loss and have become irited by their unsuccesful search for her, the hive containing the Italian queen should be plaeed on a level spot of ground near its future stand, with a swarming cloth tacked to and spread on the ground in front of it. Then, after smoking or alarming the remaining bees contained in the original hive until they are gorged with honey, they should be shaken from their combs on the swarming cloth. As soon as they have entered the hive, now placed on its stand, (which they will do in a short time,) on their becoming quiet and composed, open the hive and hang into it the remainder of their combs, thus by degrees transferring the entire contents, except the native queen, from one hive to the other.

This process is somewhat tedious, but I have not yet learned of a single instance where it has been unsuccessful, except by the escape of the Italian queen before any of the bees had entered her hive; and this may be prevented clipping one of her wings. As a colony will never receive a strange queen long as they possess a fertile one, in all the processes for introducing queens the first act to be performed is the abstraction of the incumbent queen, and the prisal of the workers of their loss by shaking the bees from several combs nto their hives. This usually so alarms them that they proceed at once to rge themselves with honey, which renders them so docile and tractable that have, in a great number of cases, introduced Italian queens as soon after as they indicated their consciousness of the loss of their queen, by their moaning noise, by simply taking the Italian queens by their wings, with the thumb and forefinger of my right hand, and *slowly* and *gently* placing them on the top of combs of the queenless colony among the workers, *still holding her fast, ever, until the workers indicate their willingness to receive and treat her kindly,* uch they usually do by offering her food, and such other manifestations of or as they habitually display towards their own queen. This allays all her s of violence from them, and when released, which may be done, if kindly ed, within a minute after presentation, she will glide down between the ns with perfect composure, which, in turn, allays all suspicion or excitt among the workers, and relieves her from danger. If, however, on preing her, she is attacked by the workers, she should, without delay, be with-n, (without, however, making such a quick or rapid movement as to ex-the bees,) and the attacking bees instantly crushed. In the course of a

few minutes she may again be presented, sometimes with success; but if not she should be removed as before, and replaced with her own nucleus, in doing which the same precaution should be used as in presenting her to the new colony, otherwise she may perish by the cruelty of her bees. On the following day, after smoking the queenless colony until all the bees are thoroughly subdued and gorged with honey, the queen may again be presented as before directed. If they shall refuse to receive her, it is safer to let them remain seven days from the time they were deprived of their queen, by which time will be found they have constructed a greater or less number of queen cells upon their combs, in which embryo queens are being reared. All these should be removed, or the embryo queens destroyed. On the following day, after again smoking as above described, the queen may be presented as before.

Last year, in introducing probably sixty queens by this process, only three or four failed of success. It, however, requires some skill, judgment, and experience in handling bees.

Another method is to first remove the incumbent queen, and on the following day prepare a small fine-meshed wire box or case, (not of brass or copper,) about three inches long by one and one-half inch in diameter, with an aperture at each end large enough for the free passage of the queen. In this cage should be placed a small piece of honey-comb containing enough honey for the queen and half a dozen bees for a period of four or five days. The queen, with half a dozen "workers," should then be placed in it, and the entrance of the aperture closed with a covering of wax, the cage suspended firmly between two combs in that part of the hive where most of the bees are clustered, and in such position that the bees in the hive may communicate readily with the queen, and have free access to the wax-closed aperture. They will soon gnaw it open and release her. Several other contrivances have been resorted to, but with limited success. I succeeded, in my early experiments, in making some safe introductions by immersing the queen in honey at the time of presenting her, but found, ultimately, that unless the recipients were in the proper *mood*, at the time of her presentation, they would sometimes kill her.

An incident showing the discrimination of these wonderful little insects occurred in midsummer, some three or four years ago. On searching for an *impregnated* queen, (then about two weeks old,) and failing to find her, I presented the colony an *impregnated* Italian queen; and, as she glided down the comb, I observed they did not treat her with that marked kindness which I expected. The hive was closed, and at the end of about half an hour, on again opening it, I discovered two knots of bees, each containing a queen; and on separating the one containing the unimpregnated queen, I found her lifeless while the fertile queen, though a stranger, was still retained alive.

PROFITS AND IMPORTANCE OF BEE CULTURE.

The profits of bee culture, like other pursuits in life, depend greatly upon the knowledge of the subject possessed by the bee-keeper and the *proper management* of his bees. The difference in continuance and abundance of pasturage in different localities will of course produce widely different results, but there are very few, if any, localities in the United States habitable by man in which bees *properly managed* will not pay a bountiful compensation for their cultivation, while in the more favorable localities four or five hundred per cent. annum is no unusual product. In California, and in some of the southern States, where the pasturage continues to abound for the greater part or nearly the whole of the year, the product is often still greater. An average of

pl honey per year from each colony, under proper management,
r re be a very low estimate.*

ccording to the census of 1860 there are 2,423,895 farmers in the United
d Territories. All these, besides many engaged in other pursuits,
veniently and profitably engage in bee culture. Allowing an average
colonies to each of these—say two and one half millions of persons—
might be 100 colonies each without encountering the danger of over-
as there is now a number of apiaries in this country containing over
onies,) and the average annual product of each colony at 50 pounds,
regate product would be twelve hundred and fifty millions of pounds,
25 cents per pound would amount to upwards of three hundred mil-
ox dollars annually.

rding to the census of 1850 there were produced in the United States
itories in that year 14,853,790 pounds of beeswax and honey, while
or 1860 is 1,357,864 pounds beeswax and 25,028,991 pounds of honey,
an increase of about 77¾ per cent.

to the publication by Mr. Langstroth of his excellent work on bee
, and the introduction of his movable comb system of bee keeping, the
had for some years been gradually, and in some localities rapidly
ng, owing greatly to the ravages of the bee moth; inventions of hives
prevention of which were not lacking in either abundance or variety.
of these, however, instead of preventing it, proved most excellent
ies for the spread of its devastations; while others, perhaps from
nce of their habits, were so constructed as to prove, sooner or later, cer-
nestruction to any colonies that might be placed in them. Several kinds
se hives had been extensively used throughout a great part of our
, producing destruction wherever introduced, until repeated trials and
itments had driven beekeepers generally to the conclusion that profita-
e culture had ceased to be practicable in this country, and so discouraged
as to cause them to abandon the pursuit entirely. The expectation that
nive, *of itself* will ever be found to prevent the ravages of the bee moth,
n absurdity, which none but the ignorant or malicious will assert. The
themselves are the only safe and efficient protectors against the moth, and
properly cultivated are *fully competent* to the task. Still, until the re-
knowledge of the subject becomes generally disseminated, this prejudice
oubtless continue to a greater or less extent to exist. It is, however, most
ng to know that already there are a few extensive apiaries in different
s of our country, which, under enlightened cultivation, produce annually
verage of from five to fifty dollars' worth of honey and wax to each colony;
quantity varying in consequence of difference in locality and management.
e apiaries are, however, comparatively few, and in view of the great
ortance of this branch of agriculture it is deserving of far more notice and
leration than it has hitherto received. A single half acre of ground
es abundant space for the location of an apiary of two hundred colonies,
(I am sure I speak within bounds in saying,) under proper culti-
in an average locality, can be made to yield from three to four tons of
annually, the production of which (unlike that of sugar or any of the
crops of our country) is spontaneous, requiring no ploughing or toil of man
production; nor does it, like those, exhaust the fertility of the soil. In
t is simply *saving from waste* that which nature provides in most lavish

he ddle and western States it is not uncommon in some localities for single colonies
of 100 or more) to produce 100 pounds and sometimes as high as 200 pounds
ey in a good season. Query: If any *one* colony in a large apiary produces such
ay should not all? The pasturage being *equally near* and *abundant to all*, it is
t the true reason must be found in the difference of condition or management (or
ent colonies.

abundance, by bringing into proper use the means provided for its col and preservation. This subject presses itself the more urgently for fa consideration at this time, from the fact that one of the principal sourc which our "sweets" have heretofore been obtained has (in consequence national difficulties) been almost entirely cut off, while the vicissitudes have incapacitated a vast number of persons in the rural districts country for pursuing their usual vocations, (though still capable of att to the manual of bee culture.) It has also left many widows* and children without the means of support, who may, in this pursuit, find a competence.

As this however must depend in a great measure upon their skill agement, and as the mass of them at present know but little of the su becomes an object of much importance to establish some means for the dissemination of the requisite information as speedily as may be. F among these, I should regard the establishment of a periodical devote sively to bee culture. The publication of such a journal was con the beginning of the year 1861, by Mr. Samuel Wagner, of York, Pen whose long experience and perfect familiarity with the history and pr bee culture, both here and in Europe, eminently fitted him for the und It was continued with marked ability to the close of that year, when quence of the general prostration of business, and absorption of pub tion by the war, it was thought best to suspend its publication for being, and await a more propitious season. Doubtless were its va extensively known, it would receive such encouragement as woul the resumption of its publication immediately. While the standard "Langstroth on the Honey Bee," and "Quinby's Mysteries of Bee K should be read by all, such a journal coming to its subscribers at sta keeping pace with the improvements and discoveries that may be m time to time, and furnishing practical experiments and results, could greatly interest and profit the bee-keeper. The adoption of this jc premiums of half a dozen or more copies each, by all the agricultura in our country, would doubtless furnish the support needed to justif sumption of its publication, and I am quite confident it would to m one of the *most acceptable* premiums that could be offered.

Next in importance is the establishment of apiaries in connexion various State agricultural colleges, now or hereafter to be established in t States, and the employment of such skilful and *practical* teachers as fully competent to impart thorough instruction in this department. Suc have been for several years in successful operation in some parts o and under judicious management here would not only prove of vast the purpose of imparting instruction, but might also yield a co revenue, or at least prove self-sustaining.

NOTE.—Apiarians generally have limited the possibility of the impregnation o bee to within three weeks from the date of her maturity, and state that it rarely occ period; but I have in a few instances had them impregnated at later periods; o cently on the thirty-fifth day after she emerged from the royal cell; and instances cited in which it has occurred at still later periods. In some cases, howeve partial, the queen laying worker eggs but a short time, and in limited numbers o

* Already a number of ladies are extensively and most successfully enga culture, one of whom I am informed has nearly four thousand pounds of sur besides a considerable number of swarms, the product of about 100 colonies year.

EPORT OF THE SUPERINTENDENT

OF THE

EXPERIMENTAL GARDEN.

I have the honor of submitting a report of progress in the Experimental attached to the Department of Agriculture.

y last report brief allusion was made to the necessity of the department at its disposal increased facilities for the cultivation of specimens of the cereals, vegetables, and fruits, in order to test their comparative merits. :essity for a series of such experiments is very great; most of our cul- grains and vegetables have run into a vast number of varieties, many comparatively worthless.

sale catalogue of agricultural and garden seeds now before me, there are ıted 52 varieties of peas, 32 varieties of beans, 34 varieties of lettuce, :ties of onions, 48 varieties of turnips, 42 varieties of cabbage, and 10 s of celery. No one desires, neither is it necessary, to cultivate all of it is, therefore, of much importance to know which are best and most for the purpose required—whether early or late, large or small; whether ive, of good keeping qualities, or otherwise. Possessed of such infor- the buyer could make his purchases understandingly, and the seller peedily drop unsalable sorts from his list, and both would be gainers. gical authors have done much toward diffusing a discriminative knowl- fruits, and it certainly is of equal importance to procure and disseminate parative merits of vegetables and grains, describe them properly, estab- ıonyms, and unhesitatingly condemn those that are useless or of inferior

commencement toward carrying out the above suggestions, forty vari- potatoes were procured, but owing to the very limited extent of ground arden, only a small quantity of each kind could be planted. The season dry and unfavorable, consequently the result of the crops was not sufficient basis upon which to found an opinion as to their comparative Similar attempts were made with peas, turnips, and other plants, with ılts.

utility of establishing orchards of the various fruit trees must be keenly ıt to all who are conversant with the importance of this interest. Every of fruit suited to the climate should here be represented, if for no other than that of assisting toward a correct nomenclature. But the advan- such a collection would not be confined to that alone. Every peculi- nnected with growth would be exhibited, and, if carefully noted, would hend a fund of information of great value to the country.

garden embraces about six acres of ground, an area so limited as to pre- ıe idea of even commencing the formation of orchards for the purposes ed. As a garden of examples in culture it is well suited, but for pur- f comparative experiments in field and general garden crops it is alto- inadequate. In view of the necessity of commencing a collection of

fruits for the purposes alluded to, means were taken to secure st leading varieties of the *small* fruits, such as grapes, strawberries, r and currants. Of the two first-named kinds a good assortment i planted, which will afford facilities for comparison at an early period.

GRAPES.

Considerable attention has been given to the collection of improved grapes. The various casualties to which this plant is subject, the rapid creasing number of new varieties, and the general interest manifested culture, suggested the propriety of exertion in order to make the garden complete as possible. Accordingly, about one hundred varieties were in the spring of 1863, all of which are believed to be properly named.

These have been placed under conditions as nearly alike as possil will fruit in the summer of 1865, when their comparative merits will be tained, and those unworthy of further attention expunged from the co By this means it is reasonable to hope something may be done towar r out worthless sorts that only hinder the rapid extension of those really of value.

The list will be increased as rapidly as possible, and when the obje intentions of the garden become more generally known, those who poss and valuable seedlings will doubtless willingly furnish a specimen of comparative trial with those already in the collection, in return receiving a antee that no plants of such new kinds will be sent out of the garden witho e mission of the donor. Several new seedlings have already been receiv these terms, for, as a matter of course, it cannot be supposed that rare will be received for unlimited propagation and gratuitous distribution.

The collection of hardy, or reputed hardy, varieties of grapes at present sists of the following sorts:

Anna.
Allen's Hybrid.
Albino.
Alvey.
Adirondac.
Baldwin's Lenoir.
Brandywine.
Blood's White.
Blood's Black.
Brackett's Seedling.
Beansville.
Berks.
Cloanthe.
Chillicothe.
Canby's August.
Cunningham.
Cynthiana.
Concord.
Clinton.
Columbian White.
Cuyahoga.
Crevelling.
Clara.
Cassady.
Catawba.
Chippewa.
Christine.
Coppermine.
Cheowa.
Clever.
Clappier.
Cairnano.
Devereaux.
Dracut Amber.
Delaware.
Diana.
Elsinboro.
Emily.
Flickwir.
Franklin.
Flora.
Garrigues.
Greverson.
Gravel.
Helen.
Hammil's Seedling.
Hiawasse.
Hyde's Eliza.
Henshaw.
Herbemont.
Hooker.
Hartford Prolific.
Huntingdon.
Hearthenge.
Isabella.
Ive's Seedling.
Jacobi.
Ketchum.
Lenoir.
Logan.
Lincoln.
Louisa.
Louisville.
Lydia.
Little Giant.
Mary Ann.
Maxatawny.
Murdock.
McLean.
Marion.
Mead's Seedling.
Marker.
Miles.
Northern Muscadine.
New Buda.
Norton's Virginia.
North America.
Ohio Claret.
Ontario.
Ohio Segar Box.
Old House.
Otoe.
Pauline.
Purple Favorite.
Powell.
Perkins.
Rachel.
Raabe.
Regina.
Rebecca.
Red River.
Rogers's Hybrid, No. 1.
Rogers's Hybrid, No. 2.
Rogers's Hybrid, No. 3.
Rogers's Hybrid, No. 4.
Rogers's Hybrid, No. 9.
Rogers's Hybrid, No. 12.
Rogers's Hybrid, No. 13.
Rogers's Hybrid, No. 14.

Hybrid, No. 15.	Rogers's Hybrid, No. 34.	Telegraph.
Hybrid, No. 19.	Shaker.	Union Village.
Hybrid, No. 20.	To-Kalon.	Wilmington.
Hybrid, No. 22.	Taylor.	Woodbury.
Hybrid, No. 27.	Traminer.	Wilder's, No. 6.
Hybrid, No. 33.		

STRAWBERRIES.

:cordance with the objects of the garden, a commencement has been ward a collection of strawberries. The following varieties are under ion:

	Hooker.	Ross's Phœnix.
	Honeur de la Belgique.	Reine Hortense.
ew Pine.	Imperial Scarlet.	Scott's Seedling.
Pine.	Jucunda.	Seedling Eliza.
	Jenny Lind.	Sir Adair.
St. Julian.	Jesse Read.	Sir Harry.
'ine.	La tour de Mauborg.	Stirling Castle Pine.
Seedling.	Longworth's Prolific.	Sir Charles Napier.
Superba.	Lady's Finger.	Trollope's Victoria.
s Prolific.	McAvoy's Superior.	Triomphe de Gand.
Brabant.	May Queen.	Vicomptesse Hericaurt de Thury.
te.	Madame Vilmorin.	
et.	Moyamensing.	Wonderful.
Seedling.	Oscar.	Wilson's Albany.
.	Pineapple.	Walker.
eeded.	Russell's Seedling.	Wizard of the North.
ne.		

ompliance with your request, the following notes on miscellaneous horti- l operations have been prepared as an exposition of the practice pursued garden of the department:

ORCHARD HOUSES.

nall orchard house has been erected and put in operation for the double es of presenting an example of a cheap plant structure, and to illustrate thod of fruit culture by restricting root-growth.

orchard house is comparatively a new feature among horticultural struc- It is simply a miniature orchard under glass. At first sight such an ement would seem altogether superfluous, as our climate is so favorable -growing; but while this is perhaps true in a general sense, we find, on closely into the particulars, that many portions of the country are not rably situated in this respect as others, as, of course, might be expected the climate ranges from a frigid to a torrid zone. Then, again, the injury ng from insects, from early and late frosts, from extremes of temperature, light, mildew, rot, and other casualties, all combine in completing a able phalanx of difficulties, too familiar to fruit-growers.

genial modified temperature of the orchard house exempts the inmates ie injury resulting from sudden and extreme changes and their concomi- ils, while the insect family, so destructive to our fields and orchards, can be destroyed or excluded.

ile these advantages are in themselves of importance, yet they are only ital and consequent upon a principle in plant-growth which is entirely control in house culture. This principle is clearly stated by Lindley in lowing sentences:

atever produces excessive vigor in plants is favorable to the production of leaf buds, vorable to the production of flower buds; while, on the other hand, such circum- as tend to diminish luxuriance and to check rapid vegetation, without affecting lth of the individual, are more favorable to the production of flower buds than of

These sentences contain a theorem upon which success in fruit culture depends, and upon which are founded the various devices and expedi sorted to by intelligent fruit-growers.

A fruit-bearing tree must attain to a certain degree of maturity before i produce fruit, and this period may be hastened or retarded, as willed by cultivator. Recognizing the fact that an extra luxuriant growth and a condition of the plant are to a certain extent antagonistic properties, and that in soils of ordinary fertility the wood-producing force strongly nates, fruit-growers practice various expedients, with a view to check wood-growth and encourage the formation of fruit buds. Grafting strong ing sorts upon those of less vigor is a favorite and effectual mode; down the branches, pruning the roots, and restraining root-growth by c them to limited areas, are processes practiced with more or less success.

Restricting growth by confining the roots is the most immediately of all modes, and this is one of the conditions obtained in orchard houses. effect this purpose the trees are placed in pots or boxes; the roots speedily them, and further extension is checked, resulting in thoroughly matured w growth, and a profuse formation of flower buds. The main difference bet the interior arrangement of a greenhouse and that of an orchard house is, in the first named the pots or boxes are set on shelves supported by stag while in the latter they are placed on a bed of soil. Much of the success tending the system depends upon this peculiarity. The limited portion of soi contained in the pot would not, in itself, be sufficient to enable the plant tc ture a good crop; but by placing the pots on a bed of soil, the roots will p through the holes in the bottom and ramify unrestricted while the fruit u turing, and a comparatively heavy crop can be produced.

It has already been remarked that an over-luxuriant growth of branches will defeat the object of retaining a fruitful habit, and if the pots are left permanently in this position barren growths would follow. Therefore, as soon as the fruit is matured, further extension of growth is to be checked by turning the pot so as to twist the roots. This operation should be repeated once a week until the roots are entirely separated from the pot. This will completely check wood-growth, and the branches will again become studded thickly with fruit buds preparatory for another crop.

The principles upon which this mode of culture is founded are so apparent, and their practical application so simple, that they can be understood even by a tyro in vegetable physiology.

With a view to admit of a more rapid extension of root-growth during the fruit-maturing period, several trees have been placed in pots with perforated sides. The perforations are half an inch in diameter, and placed two inches apart over the whole side surface of the pot. These pots are plunged until the rims are level with the surface of the soil, and the young roots speedily avail themselves of these openings and occupy the surrounding soil. It may be remarked that we have used these pots in the greenhouse. The ho stuffed with moss, and the plant potted in the usual mode. The free ad of air to the roots, and the reduced evaporating pot surface, renders the sity for watering less frequent, and many greenhouse plants thrive bet these than in the pots as generally constructed.

In order to furnish examples of various modes of applying the principles of house culture of fruits, a small house has been arranged with a shallow bed of soil, in which the trees are planted without pots. This is perhaps a more permanent arrangement than that previously described, and possesses decided advantages with regard to the details of management. The depth of the soil does not exceed nine inches, and its drainage and ventilation carefully secured. In this mode the plants are as completely under control as when grown in pots. When a tendency to overgrowth becomes apparent, the trees are root-pruned

ıy running in a sharp spade round them, an operation requiring only a few nutes to each tree.

Any kind of fruit tree may be successfully cultivated under glass. Peaches, ctarines, plums, cherries, apricots, gooseberries, and even pears and apples, 'e been produced in great perfection in orchard houses.

MANAGEMENT OF THE HOUSE.

The most important point is ample ventilation; a closely pent, damp atmo-ere is fatal. A free circulation of air should constantly prevail, even if fire-is applied in spring. To force early fruit the ventilators should not be tightly sed, except during severe frosts. No heat should, by any means, be applied rther than to keep the temperature above the freezing point. A heating ap-ratus will be found very valuable, enabling the cultivator to take advantage ıf warm weather in February without fear of losing the crop by March frosts. A simple furnace and flue will answer every purpose.

The greatest watchfulness should be given to keep the plants free of insects. Syringing with water daily will assist wonderfully in warding them off. The troublesome are the aphides and the red spider. Fumigating with tobacco ıı destroy the former, and dusting with sulphur the latter.

GROWING FRUIT TREES IN WOODEN TROUGHS.

Very prolific dwarf trees may be produced in wooden troughs in the open air. These are made with twelve-inch wide boards for sides and bottom, nailing the sides firmly to the bottom to guard against roots protruding into the soil beneath. These may be of any length; the trees set about three feet apart. As in pot culture, so in these troughs the roots are restricted, and an early fruitful condition secured.

Those who have acres of peach orchards will not be likely to adopt this mode of culture; but there are many city yards where fifty feet in length of such trees could be introduced, and would not only prove an agreeable recreation to the owner, but would also furnish an amount of fruit which would astonish those who have not taken lessons from nature in fruit-growing.

In northern latitudes, where peaches, apricots, and nectarines will not thrive in ordinary orchard culture, an arrangement of this kind on the sheltered side of a garden fence may be introduced with profit. The facility of protection during winter will readily occur, even to those not particularly gifted with inventive faculties; and where other modes of protection will not suffice, the boxes may be made in lengths of eight or ten feet, and the whole affair carried into a barn, cellar, or under a protecting shed, covering the roots with straw, to prevent injury from severe frosts.

LEAF BLISTER ON THE PEACH, ETC.

The curl or blistered appearance so frequent on the leaves of peaches in early summer is one of those questions annually canvassed by rural writers. The prevailing opinion still inclines to the belief that it is the result of insects. The fact that the aphis is frequently observed on these diseased leaves keeps up the lingering probability that they are the cause, notwithstanding that they are as often absent as present on the curled leaves.

So many instances have been noted where portions only of a tree have been attacked (the rest of the tree being protected) that it seems almost unnecessary to make any further effort to prove its atmospheric origin. Early in April, 1863, two peach trees were selected from a collection then in full leaf in the orchard house, and placed in the open air. In a few days there was scarcely a healthy uncurled leaf on the trees, and no aphis visible.

PRUNING.

Pruning is an operation of vast importance in the management of trees the principles upon which it is founded must be clearly understood be plete success in fruit culture can be attained.

Plants left to nature maintain a well-balanced reciprocal action between their branches and roots; and every branch, bud, or leaf that is removed ercise an influence either injurious or beneficial, and no one should at to remove branches unless they foresee the effects and influence of such re

The time of pruning, whether during summer or during winter, will upon the object to be attained; a brief consideration of plant-growth will us in determining this question.

When a seed is deposited in a suitable germinating medium, its firs is to send a root downwards in the earth, and then push a shoot upwa the air. The seed contains within itself all the nutriment necessary fo process; but as soon as the young plant is so far formed, its mode of e ence is changed, and it becomes dependent upon the soil and atmosph future support.

The elementary substances absorbed by the roots undergo decomposition through the influence of the leaves, and the material is thus prepared for fur ther root-growth and extension. The roots have no inherent power of exten sion, but are dependent upon the health and action of the foliage; and, although in germination the roots are first formed, their growth is due to the action of the foliage of the plant that produced the seed from which they emitted.

It is, therefore, apparent that the increase in size of the plant, the quality and quantity of its secretions, and the extension of its roots, are all dependent upon the healthy action of leaves.

When it is considered how essential the foliage is to the healthy develop ment of the plant, we may well pause before infringing upon the reciprocal action nature has established between the roots and branches; for it is evident that every branch or leaf removed has an effect either for good or for evil upon the plant. The correlative action between leaves and roots being so intimately connected, it follows that any diminution of leaf-growth during the period of active vegetation must retard root development. Hence it is an axiom, now becoming recognized, that summer pruning weakens growth, while winter prun ing produces a contrary effect.

Summer pruning can be useful where wood-growth is to be checked, and i will be repressed in proportion to the severity of the removal of foliage. Fru trees, when planted in a generous soil, frequently attain a luxuriance incom patible with a fruitful habit, and their flowering may be somewhat hastened by judicious summer pruning or pinching, so as to retard wood-growth; bu care must be exercised, and much observation and experience are requisite, be fore the object can be safely attained.

Winter pruning invigorates wood-growth. When a portion of the branche of a tree is removed after the fall of the leaves, the balance of growth is de stroyed and the roots have the preponderance; the remaining buds will no shoot forth with increased vigor—an important consideration with trees or vin that have become weakened from overbearing, or any other cause, impartin new vigor to weak and sickly plants.

The time for winter pruning may also be regulated by the condition of th plant; if pruned immediately after the leaves fall or ripen, the shoots will l stronger the succeeding season than they would be if the operation had be delayed until spring. This arises from the fact that during winter the pla still continues to absorb food by its roots, which is distributed over the branche

l as the principal flow of sap is always directed to the extreme points of ›ots, the highest buds are most fully developed. If, therefore, pruning is ayed till spring, this accumulation is cut and thrown away, and to that ex- the plant is weakened. Early winter pruning is eminently advantageous native grapes. As the retained buds become charged with sap during inter, they start vigorously and advance rapidly—a matter of much moment ere the summers are rather short for ripening the fruit and wood of these nts.

There is a tendency in many varieties of trees to form strong central growths the expense of the side branches, more especially while the plants are ng. Pruning these strong shoots in winter only increases the evil, unless mer pruning is attended to by pinching out the ends of every shoot before ains sufficient headway to injure the growth of the lower branches. Strong wths should be pruned in summer and weak ones in winter. In the man- ment of hedges, where uniformity of growth is all-important, this rule should constantly kept in view.

When the size of a tree is the only object sought, summer pruning should be practiced. But it may be said that pruning of any kind is a negative peration, and probably it is within the limits of possibility that trees may be trained to any form, and maintained in a fruitful condition without any instru- mental pruning whatever, unless to remedy disease and casualties. It is much easier, for instance, to rub off a bud in May than it is to cut out a branch in December; and if a judicious system of disbudding and pinching was strictly followed, there would be no occasion for winter pruning; or. were it possible to place a tree in such a soil, and under such conditions that it would only make a moderate growth of well-matured wood, little, if any, pruning would be required. But as all of these conditions are difficult to realize in happy combination, we have to resort to pruning, and a knowledge of the principles involved will materially assist the operator.

EXPEDIENTS FOR PROMOTING FRUITFULNESS IN PLANTS.

All expedients for inducing early fruiting are founded upon the well-known law that excessive growth and great prolificness cannot simultaneously exist in the same plant. Some of the most familiar modes of inducing fruit are as under:

1. BY DWARFING.

In pomological parlance, trees are said to be *dwarfed* when grafted or bud- ded on stocks of weaker growth than themselves. Thus we have the pear on the quince, the cherry on the mahelab, the apple on the Paradise stock, the peach on the plum, &c. This is a popular and efficient mode of rendering trees fruitful. Properly speaking, any low tree is dwarf; the term when applied to a system is merely technical.

2. BY BENDING THE BRANCHES.

This process practically consists in allowing the branches of a young tree to grow undisturbed by the pruning knife for several years until the plant attains considerable size; the young shoots are then bent down and secured to pegs fastened in the ground. This mode is eminently adapted for standard pear trees, especially such varieties as Dix, Bartlett, Sheldon, and others that make long yearly shoots; these when bent down soon become studded thickly with blossom spurs, and very ornamental and symmetrical trees can be formed by a little attention to the bending and regulating the shoots; the pendent form soon becomes fixed, and trees so treated are certain to be productive. The proper season to commence tying down is the month of August; the

young wood will then be sufficiently matured to bend, and many of the forward buds will form short fruit spurs, and bloom the following spring. and plants of all kinds can be incited to flower and fruit, no matter how riant their growth, by careful observance of the bending process. Horn training is a modification of this system, and is a well-known method o couraging fruitfulness.

3. BY PRUNING THE ROOTS.

When a tree has reached a fruit-bearing size, and shows no sympt fruit-bearing disposition, but instead, throws out vigorous branches, root-pru is a very efficacious mode of checking growth. In highly cultivated where trees are planted, and the roots have access to the rich soil, an crop of branches will be produced, but little, if any, fruit. Root-prun check such growths most effectually and render the trees fruitful. eration is performed by digging out a circular trench at a distance of three to six feet from the stem, according to the size of the tree, and cut the roots that are encountered or can be reached. The soil is again thrown back, and the process is completed. If done in August the supply of sap will immediately be lessened, the wood-maturing principle accelerated, and fruit buds formed. The operation has been performed in spring with but little benefit, but if done in the fall cannot fail in producing the desired results.

Root-pruning has successfully been applied to young evergreens consequence of growing late in fall, are liable to have the points of shoots jured by early frost. When growth is stopped by root-pruning the shoots ture sufficiently to withstand the winter without being injured. A few y of such treatment when the plant is young is found sufficient, as the spec will attain hardihood with age.

4. BY RINGING THE BRANCHES.

This operation is performed by removing a ring of the bark from a branch, so as to arrest circulation. This, however, is done with a view to hastening the ripening process of fruit, and has long been practiced, particularly on the grape-vine. It is, however, of doubtful utility, as the branch beyond the point of operation is destroyed. It has the effect of not only hastening the ripening, but the fruit will be somewhat increased in size. Grapes produced in this manner are easily recognized by their thick skins and coarse texture of the fruit.

5. BY LIMITING ROOT GROWTH.

The most satisfactory application of the principle is that of restricting the growth by confining the roots in pots, boxes, or other similar conveniences, as is well exemplified by the great crops produced on fruit treets in pots. Florists are also alive to the fact that their flowering plants will blossom most profusely when the pots become well filled with roots.

GENERAL REMARKS.

The mechanical condition of the soil is of more importance in fruit culture than its chemical constitution. In its preparation, therefore, the aim should be to secure good depth with perfect drainage, and avoid heavy dressings of rich manures. The object is to maintain a moderately luxuriant growth with early and thorough maturity in the wood, and this can be best attained in comparatively poor soils.

KEEPING GRASS LAWNS.

To have a perfect lawn it is absolutely necessary to have it properly laid down at the outset. This, however, does not consist so much in enriching the soil as in rendering it friable and porous by draining, subsoiling, and pulverizing

The main feature in keeping lawns is frequent mowing, and if this is neglected fine lawns cannot be maintained. It will matter but little how much expense and skill may have been incurred in the preparation and seeding of the ground if it is allowed to grow at random afterwards, as the strongest foliaged grasses and clover will eventually supersede the finer kinds if the cutting is not regularly attended to. On the other hand, lawns that have been but inferently prepared may be rendered close and regular by frequent mowing judicious top-dressing.

Early cutting prevents the growth of the coarser grasses and induces lateral growth on the finer, thus covering the surface with a dense foliage, which resists the effects of sun and long-continued dry weather.

Every lawn of any pretensions should be kept smooth by a machine. Not only is it economical as regards labor, but it is scarcely practicable to keep it th a scythe so smooth, thick, and velvety as can be done with a good lawn-mower. Another advantage is that the grass is not removed, but falls down a shower over the roots, forming a very efficient mulching, and enabling us impart to our pleasure grounds all the character of the finest lawns, an atament that has hitherto been deemed beyond our ability to realize.

When the grass becomes thin and of weakly growth a top-dressing of good stable manure should be laid over the surface in December. It is important that the manure should be well rotted before being used, and as occasion offers during winter it should be broken up and manipulated with an iron rake. The object in view is to distribute it evenly over the whole surface. Break it finely, so that it will settle down and nourish the grass roots. When spring opens, the rough, strawy portions, if any are left, should be removed; otherwise it would interfere with the proper keeping of the surface.

NIGHT TEMPERATURE IN GLASS STRUCTURES.

One of the most prevalent and injurious errors in the management of greenhouses and other plant-houses is that of keeping the temperature too high during the night. With many the aim seems to be to maintain as high a degree of heat during darkness as during light, a practice opposed both by science and the results of experience, and one that cannot be too severely condemned.

It has been observed that plants will lengthen very fast during darkness in a high, moist atmosphere, and it has therefore been supposed that a gain in growth is thus secured, but strictly, this is not the fact. Any extension of growth made under such conditions is at the expense of that made during the presence of light, as it is only then that those chemical changes are in operation that change the matters absorbed by the roots into the woody fibre and er constituents of plants; consequently the same quantity of material is simply ongated as in drawing out a wire, which may be lengthened without adding nything to its structure.

Plants grown in a nearly uniform temperature under glass seldom ripen or ture their wood in a thorough manner, the buds are immature and make ble growth, and the whole plant contracts a delicate habit of constitution, ich renders it incapable of withstanding the slightest neglect without injury, h entailing great care to keep it even in its sickly condition, and never, by means, developing its natural capacities. On the contrary, plants conntly subjected to a suitable lowering of night temperature are more robust, ve short-jointed and matured growths, flowers not only expand more fully, remain longer in perfection, fruits better colored and flavored, and more t in every respect than those developed in an atmosphere of uniform nd moisture.

th regard to greenhouse plants, it should be remembered that they re-

quire no heat during night further than to exclude frost. It has been and urged as a reason for keeping a higher temperature that it is necessary to do so in order to secure a succession of bloom, but it has been amply proved that by allowing a more liberal heat, say from 70° to 80°, during day, more profuse crop of flowers will be gained than in the more equable tions insisted upon.

Another injury consequent upon a high night temperature during arises from the great extraction of moisture from the atmosphere. To ma an inside temperature of even 50° when the external is near zero inv rapid generation of heat, and as the capacity of air for taking moisture incr in proportion to its rise, a great demand is made upon the plants and everything in the house capable of giving up moisture. The quantity of wate carried off may be seen by the deposition of ice on the inner surface o glass after a night of severe frost. Ice one-fourth of an inch in thick often found under these circumstances, the result of condensation and fr of the water carried from the contained moisture in the atmosphere and the surfaces of the plants. The parched and unhealthy aspect of the subjected to such treatment is sufficient evidence against the propriety o practice. The expense of fuel and labor required to maintain this inju temperature is also an important consideration.

CULTIVATION.

The great aim of all thorough cultivators is to maintain a continued healthy and vigorous growth from the period the seed vegetates until the plant reaches its maturity. The word *cultivation* may be defined as a term whereby we recognize those operations necessary to maintain a constant and proper equilibrium of the elements of plant-growth. Therefore, in order that we should be able to do so understandingly, it is absolutely necessary that we be thoroughly conversant with the principles governing vegetable growth; in the absence of such knowledge practice is merely empirical.

One of the prominent operations in culture is that of stirring the surface of the soil around growing crops. The soil may be looked upon as the laboratory of nature where her great decomposing agencies, air and water, prepare the food of plants, and the object of culture is to facilitate these chemical operations as far as our knowledge will admit; and experience fully proves that frequent forking, loosening or stirring the surface stratum of the soil, thus allowing an unimpeded access of air and moisture to penetrate and follow the various ramifications of plant roots, is undoubtedly the most essential item in what is termed cultivation.

The efficacy of this treatment depends, however, upon the nature and condition of the soil, as, also, upon the time and mode of performing the operation. Unless the subsoil is also porous and permeable, its benefits will be comparatively slight. Hence soils that are not naturally pervious must be rendered so by draining and subsoiling.

Soils so treated will continue to support vegetation in a healthy and luxuriant growth even in long-continued dry seasons. This is owing to the facility with which the rain water can penetrate deeply, its downward passage being encouraged by the admission of air, and when, in addition to drainage, the surface is kept loose and open, the rains of a heavy shower penetrate at once instead of passing off on the surface, as will be the case when the top soil is compact, and the sub-soil undisturbed. Clayey and tenacious soils require more careful treatment than those of a gravelly or sandy character; these are liable to become hardened on the surface after even slight showers. This is occasioned by their easy solubility, and good management of such soils demand that they should be surface-stirred after every heavy rain. Much now depends upon the

such stirring is performed. Between the softening of the surface by rains its hardening again by sun and dry air there is a period when it is in the t favorable condition for culture. Here it is difficult to lay down a definite , as the practice that would be suitable for one soil and climate would be ited to another differently circumstanced. The principle being understood, practice may readily be deduced. In order to facilitate cultivation all crops uld be grown as far as practicable on the drill system.

There is room for improvement in this respect, especially in garden culture. den crops should invariably be grown in drills sufficiently wide apart to mit of deep hoeing and forking. And it may further be remarked that e is a wide distinction between what is frequently termed a well-kept gar- and one that is well cultivated. The former may be kept perfectly clear weeds by the use of hoe and rake, every spot smooth and polished, and hough vegetation may wilt and present a starved and stunted aspect, yet ıy people would pronounce such gardening as perfect. This, however, is ; cultivation. Hoeing, as understood by a thorough culturist, means more an merely killing weeds. He aims at having the soil deeply and thoroughly ken up, and left loose, rough, and untramped. His criterion of beauty is not influenced by the element of smoothness.

SPRING AND FALL PLANTING OF TREES.

The relative advantages of spring and fall planting have given rise to many opinions, and it is not strange that a wide difference in opinion should be held on the question, since so much of success or failure depends upon the season, locality, and other attendant circumstances. The influencing agents of vegetation are subject to such a vast variety of modifications, which can neither be foreseen nor prevented, that no isolated observation, however truthfully noted, will suffice as a guide in establishing definite rules; and it may be remarked that the many seemingly conflicting opinions upon certain points of practice could, in most instances, be reconciled if all the attending facts and circumstances were clearly produced, but these items are difficult to obtain.

Perhaps the strongest argument in favor of fall planting is the particularly favorable peculiarities in the relative conditions of the soil and the atmosphere at that season. Independent of this, it is theoretically true that autumn is the best time for removing trees. A plant that has occupied its position for several years cannot be removed without curtailing and injuring its roots more or less, but there are certain portions of the year when the roots are of minimum importance to the plant. It is very evident that they are most essential when the tree is in full foliage and vigorous growth, and during this period any reduction of roots would be speedily perceptible; on the other hand, when the seasonal growth is completed, and the plant defoliated, the offices of the roots are less important. From the above we learn that the best time to transplant is between the fall of the leaves in autumn and the bursting of the buds into growth in spring, or during what is termed the dormant season.

The "particularly favorable conditions of the soil and air" may now be noted. During the month of October the soil averages ten degrees warmer than the atmosphere. This forms a species of natural hot-bed into which we place a newly removed tree, the formation of young roots is encouraged, and before many weeks elapse the plant is well established, and enabled to withstand the vicissitudes of winter and make an early and vigorous start in the following spring. The low atmospheric temperature prevents any growth in the branches, which is so far favorable under the circumstances.

In spring we find these physical conditions reversed; the soil is then cold, accumulates heat slowly while the air rapidly increases in warmth; the s are excited to growth, new leaves are formed in advance of the roots, each

leaf acts as a pump extracting sap from the branches and trunk of t
which as yet has no active roots to supply the demand; and if ev
severe and continued, the plant must either succumb or receive
as will require the whole season to recover. Hence it may freq
served that spring-planted trees will show a profusion of leav
vigorous and healthy, but suddenly wither and decay under the infl
clear, dry, and warm weather.

These so far show great advantages in favor of fall planting, but other considerations to be canvassed before deciding the question. It clear that unless planting is performed within a certain period the ad immediate root-growth will not be secured; if delayed beyond the fi November, success will be less certain. The best period is undoubtedly as the leaves change color, stripping off the foliage before removal.

The character of the soil and location will also materially influenc In undrained clayey soils the trees may not get sufficient root-hold to them to resist the throwing-out tendency of alternate freezing and thaw young spongioles may be destroyed by constant saturation. A bleak and exposed localities, the drying winds of spring may ex juices faster than the young roots can supply the demands of evapora course, the very evident precaution of securing the plant from swaying be attended to, otherwise many of the young rootlets will be tw Staking may have to be necessary where the trees are tall, but it is preferable to stay them with a slight mound of soil over the roots, which can be removed when of no further use. It will, also, be of great benefit if frost can be kept from penetrating to the roots. A covering of loose ma will be a protection—a wise precaution even on well-established trees.

In northern latitudes, where the winters commence early and continue and severe, fall planting will not so generally be successful, as in more perate regions, except in particularly favorable localities. Early spring ing, taking the precaution to prune the branches, so as to restore the destroyed by the root mutilation inseparable from removals, and mulch over the roots, so as to retain moisture during summer, will be the auxiliaries towards success.

Evergreens can, in all cases, be most successfully transplanted just as growth commences. When the young shoots exhibit symptoms of pushing, they can be removed without risk of failure with ordinary care. They may also be removed in August and September, so that they can have a good season to furnish new roots before winter. Early spring removal of such trees is not so advisable, as they have a large evaporating surface, which, when subjected to drying spring winds, require a constant action of root to maintain life.

LIQUID MANURE TO PLANTS IN POT CULTURE.

The importance of liquid manure in general cultivation is acknowledged, but the expense of its application on an extensive scale, such as to farm crops, furnishes a strong reason against its use.

It is also acknowledged that the liquid state is the best in which stimulating and fertilizing ingredients can be presented to the roots, as they can only absorb nourishment through the medium of water, and all matters that enter into the interior of plants must be in a soluble condition, or so minutely divided as to be carried along with water before they can enter into the vessels of the plant.

In the pot culture of plants, where the amount of soil is limited, the use of liquid manures is of vast service when judiciously applied, but much harm may be occasioned by its indiscriminate use. Many persons consider it necessary to resort to the use of guano and other solutions on sickly plants, and are surprised to find that the application only hastens the dissolution of the patient.

It is only healthy and well-rooted plants that are to be benefited by manures, such as are well supplied with hungry roots, but growing slowly for want ıtriment. Such plants as have been for years in the same pot or tub, as ırequently find orange and lemon trees, camellias, oleanders, &c., will be tly stimulated by the application of manurial liquids during their period owth. For plants of all kinds that have their pots filled with roots it will serviceable, and to such as fuchsias, pelangoniums, cineraries, &c., while lower, they will bloom longer and in greater perfection. But it should be ɔt in mind that stimulants should not be applied while flower buds are formas it might induce an increased wood-growth at the expense of the flowerprinciple.

anurial liquids may be applied most freely when growth is active, disconued during the formation of flower buds, and applied more sparingly during ne expansion of the blossoms. It is a safe rule to dilute severely, and use the ion in a perfectly clear state. Thick, muddy water will not be of much fit, and stops up the pores in the soil, preventing free action of atmospheric s to the roots.

Almost any substance that has manurial properties, and will dissolve readily, y be rendered available. Every greenhouse or conservatory should have a rrel fitted for the purpose. If furnished with a false bottom of close wire, l a tap between it and the bottom of the barrel for drawing out the liquid, nure water can easily be prepared.

PROPAGATION BY CUTTINGS.

To be successful in any pursuit it is very necessary that we should be conersant with the *rationale* upon which our operations are founded, and in no ıorticultural process does this apply with so much force as in plant propagaion by cuttings.

There is, however, much in connexion with this subject that remains unexplained. We know not why it is that some plants will propagate readily, while others, seemingly of similar structure, with the greatest tardiness and difficulty.

A cutting may be described as a portion of the branch of a plant that is emoved and placed in a position to form roots, so as to become an independent ndividual, possessing all the properties, and being a living representative of he original from which it was taken. Cuttings are of various kinds. Young, ender shoots, perfectly matured growths, and wood in all stages of maturity ntermediate between these extremes, are used for cuttings.

The best condition of wood-growth also varies with the kind of plant. This a question that can only be ascertained by experiment. We know of no external appearance that will indicate the special proportionate arrangement of constituents of plants most favorable for the formation of roots from cuttings. As the extension of roots is dependent upon the previous or simultaneous ion of foliage, it is found that, in general, the best shoots for propagation those possessing a considerable portion of the organized matter consequent on a ripening of wood-growth, but in which the process of vegetation is still full operation; in other words, those shoots that have commenced to mature, still possessed of healthy and active foliage, familiarly termed "half-ripened od."

The art of "striking" cuttings mainly consists in guarding against the exhaustion of the sap of the shoot by evaporation until roots are formed to support it.

The various expedients resorted to, such as keeping the cuttings in close frames, covering them with bell glasses, shading from sun, &c., have for their object the preservation of the juices of the shoot.

are soon exhausted, and the promised healthy growth is sud
lessly checked.

The main point of consideration, therefore, in the managem
so far as mere application of heat is concerned, is to stimulate
processes carried on in the vessels of the cutting inserted in th
upward bud-growth is retarded. This is secured by heating t
heating the air. The rule is that cuttings should be kept in a
temperature as low as the nature of the plant will allow, and t
they are inserted should be warmed as high as the roots wil
more completely these conditions are maintained the greater
success, and with ordinary care few failures need occur.

"Bottom heat," as it is termed, or a warming of the soil,
by various means. Those whose requirements are extensive
structure specially fitted to the purposes of propagation, wh
heated by hot water either in pipes, or wooden or cement tan
mode is, perhaps, the best; but where the quantity desired is
wants of an ordinary flower garden or greenhouse, no special
be necessary. A small hot-bed, with frame, will afford cons
nience; and those who have a greenhouse may form one of

REPORT OF THE ENTOMOLOGIST.

SIR: In compliance with orders received, the accompanying paper is respectfully submitted to you for the Agricultural Report of 1863. The subject suggested by you being the various methods at present adopted by agriculturists to destroy or diminish the numbers of noxious insects which annually injure our crops, I present the following observations made partly by myself and partly compiled from the works of various entomological authors, and the leading and most reliable agricultural journals. The subject is one of vast importance to the farming community when we consider the injury caused by the depredations of three small insects alone, viz: the wheat-weevil, the midge, and the Hessian fly; or the ravages of the curculio amongst our fruit, which in several localities have proved so destructive as to cause some horticulturists to abandon the culture of certain fruit trees altogether. Correct drawings have also been made, which may be engraved for the next year's Report, if required.

As entomologist of this department, besides the regular daily official duty, all the subjects of general natural history, such as insectivorous birds, specimens of fruits, textile materials, hemp, cotton, flax, &c., have been handed over to my charge for preservation and arrangement during the past year. Much time has been devoted to laying the foundation for a cabinet or museum of agriculture, which, it is hoped, will eventually prove a valuable adjunct to this department, both for reference and as a means of preserving new or valuable specimens of our cereals, fruits, vegetable products, and natural history. In former years many of these have been forwarded to the office, and, although duly registered and acknowledged, have hitherto been either lost, mislaid, or destroyed, for the want of a proper room in which to arrange and preserve them. This cabinet is intended to contain specimens of our principal fauna and flora; samples of maize, wheat, barley, and other cereal productions; colored models of the fruits and esculent roots, with descriptive labels of name, synonyms, and references to horticultural works in which they are correctly described; the native insectivorous and predaceous animals, birds, and insects, each specimen being correctly labelled with both the scientific and common or English name by which it is most generally recognized; the food, habits, and, if injurious, the best means at present known of destroying them. Specimens of all our textile materials, such as flax, flax-cotton, cotton, wool, and silk, (many of which are at present in the possession of this department,) are likewise to be preserved in this cabinet, as showing in the first place the seed, and afterwards the raw material or plant, with specimens exhibiting the various stages of progress the fibre has to undergo until it becomes the perfect manufactured article.

It is to be hoped that the public will see the benefit arising from such a cabinet, and help to contribute to its formation. This central collection once made, all the duplicates can be sent to the various State agricultural societies to form the nuclei of State collections, where any farmer may learn to distinguish the most reliable and best fruits or vegetable products for his peculiar locality; the beneficial birds, animals, or insects, and the best means of destroying such as are very injurious. Such a cabinet once commenced, every

year would but add to its growth and utility, as many of the old error very readily be rectified by constantly having reliable specimens at hand rect mistakes in nomenclature or popular prejudice.

As the articles on entomology, in the former agricultural reports, h such full and lucid descriptions of the habits, form, and color of seve insects injurious to the farmer that the most noxious of them can r identified, it has been thought of more consequence to devote a few p the present report to a general description of the habits and insti those most destructive and best known, with a short tabular view arrangement, classification, and the various metamorphoses or changes they undergo before attaining the perfect or winged state, and the r already employed to destroy them, or, at least, to diminish their numbe order to do this, the best of our American authorities on the subject, Harris and Dr. Fitch, and various foreign authors, Mr. Curtis, Köll others, have been consulted, and extracts have been taken from the agricultural papers and journals as to the success or failure of expe already made by well-known and reliable farmers and horticulturists. I indeed, expected that a practical farmer can spare the time to study the ical structure of an insect, or its scientific nomenclature; but it is cert the greatest consequence for him to know the peculiar habits and transfor of any particular insect destroying his crops, as it may be very easy fo kill it in one of the three stages of its existence, and almost, if not quite sible in the other two. We will take, for example, the female moth, n candle-fly, as it is commonly termed; this can be readily crushed with o in a second of time, whilst it would take hours of searching to find the h of mischievous caterpillars which emerge from the eggs she will, if undi deposit upon the leaves of culinary vegetables from one end of the g field to the other.

Again: all insects must not be considered as injurious to the farmer, them being, on the contrary, highly beneficial, as preying upon the insects themselves, waging a war of extermination upon them at all tir instance, the common ladybugs, so-called, (with the exception of a la found on squash and melon vines,) in both their larva and perfect st almost entirely upon the myriads of plant lice which infest and over oats, vegetables, and young fruit trees. It will also be necessary to brief sketch of the different orders into which insects are divided for th of such farmers as have not read the former reports. The same remed would act for a beetle, would not be of the least service when applied fo or miller, their structure and habits being entirely dissimilar. The f classification has, therefore, been made or compiled merely for the use farmers, and is not intended to interfere with any former classification scientific entomologists having the works of the various authors who voted their whole time to the subject, but is merely given in orde working farmers readily to classify and describe any of the various ins daily come under their observation, and, when writing, to call the proper names. Beetles, wasps, flies, or, indeed, almost anything crawls or flies, bites or stings, are now included under the common which, if properly used, should be applied to one order of insects

All true insects have six legs, and the mouth is provided with eit biting, or a trunk or proboscis for piercing and sucking; so that here the first great division, namely, biting insects with jaws, or sucking ins a trunk or piercer. The bees and wasps form a connecting link bet true biting insects which possess jaws, and the sucking insects wh merely a sucker or piercer, being provided with both jaws, which th bite and tear the materials with which they construct their habitatio ligula or tongue which is employed to suck up their liquid nou

sion is made from the form and texture of the wings and wing cases; very much in all the different orders, whilst those few which are possess no wings whatever, or only the vestiges of them, have been the orders to which they evidently belong, both from the structure uth and general affinity. Thus the flea, although wingless, is placed flies or diptera, as possessing a piercer or trunk, and the rudiments hich are undeveloped. The number of wings is generally four. In upper pair are hard or leathery, and covering another pair of a mem- xture, and generally transparent; in the butterfly, however, all the are exposed.

of mouth.	Wings.	
d with jaws, and ting or mastica-	Four wings: the upper pair hard or leathery, and covering a pair underneath; *under wings* folded only *transversely*, or having a sort of elbow.	*Coleoptera*, (beetles, or sheath-winged insects.)
	Four wings: the upper pair hard, or leathery, and covering a pair underneath; *under wings* folded *lengthwise* like a fan.	*Orthoptera*, (cockroaches, grasshoppers, katydids, &c.)
	Four wings: membranous and reticulated, the veins resembling *net work*.	*Neuroptera*, (dragon fly, May fly, &c.)
vith distinct man- s, and also hav- tongue, or pro- tion.	Four wings: membranous and divided into large cells.	*Hymenoptera*, (ichneumon flies, &c., wasps, bees, &c.)
	Four wings, covered with colored scales resembling powder or dust; mouth with *a spiral trunk* only.	*Lepidoptera*, (butterflies, moths, millers, &c.)
	Four wings, generally placed *horizontally*; the upper pair being half of a leathery texture, and the other half being membranous; mouth armed with a conical beak.	*Heteroptera*, (plant bugs, squash bug, chinch bug.)
d with a piercer, d not capable of ubstances.	Four wings, generally slanting upwards when at rest, like the roof of a house, and frequently of the same membranous texture; mouth armed with a beak.	*Homoptera*, (cicada, or singing locust, plant and bark lice.)
	Two wings only; mouth a proboscis, for sucking; sometimes having small, lancet-like appendages for piercing, concealed inside the trunk as in the horse fly, &c.	*Diptera*, (mosquito and house fly, bot fly, horse fly, &c.)

also undergo three metamorphoses or changes of form. First, the eposited by the female in or upon some vegetable or animal substance the young larvæ live and feed. These eggs produce grubs, caterpillars, maggots, which are indiscriminately called larvæ, from a Latin word a mask or disguise, as the insect in this preparatory state bears not st resemblance to the full-grown and perfect insect. The larva, after raciously, sheds its skin, and the pupa or chrysalis makes its appearance. his second stage of its existence the pupa takes no sustenance whatever, ies almost motionless, the limbs of the future insect appearing as if ip in swaddling clothes; hence the name pupa, which also is a Latin ifying a puppet or baby. Finally, this outer envelope is thrown off, erfect beetle, bee, butterfly, or fly, emerges from the shed skin, fully

furnished with wings, and capable of continuing the species, laying which are to produce another generation. With the grasshop and however, the eggs also are laid, but the young emerge from t certainly, but resembling the parent insect in form, and furnished wi locomotion, but having no wings; they then shed their skins, and wings appear. In this intermediate state they also continue to the last skins are shed, and they come forth into the world provi fect wings, and able to perpetuate their species. In this de however, be observed that, in the intermediate or pupa state, plant bugs are as active as ever, and, unlike the above-mentioned butterflies, bees, and flies,) continue to feed voraciously, and to c with unabated vigor. It will be proper to observe here that y tera, or true two-winged flies, undergo their metamorphoses wi case or skin of the larva or grub.

Some entomologists, nevertheless, have not regarded the structu mouth in the perfect insect or image, and from which the fo syn been made, but have classified them according to the metamorp of form they undergo before attaining the perfect state. As it woul fectly impossible for any person entirely unacquainted with h changes to classify them according to this method, we prefer the ro ment as most easy for the agriculturist, the perfect insect being am attainable, whereas the larvæ as yet have been very little studied in thi But as it may throw some light upon their habits, and occupy b we shall give the classification of Burmeister according to t or change of form which has already been explained.

Insects undergoing a perfect metamorphosis, or change of form. (Example, butterfly.)	I. *Coleoptera*, (beetles) ..	Four wings of dissimilar texture: the fore the hind wings membranous.
	II. *Lepidoptera*, (butterflies.)	Four wings, similar texture; wholly or ea ered with fine dust, like scales.
	III. *Hymenoptera*, (vein-winged insects, bees, wasps, &c.)	Four wings, similar texture; naked, and h like veins running through them.
	IV. *Diptera*, (two-winged flies.)	Two wings only; naked, transparent, and i two hind wings, generally having on each stalk-like appendage, terminating with knob-like end.
Insects undergoing an imperfect metamorphosis, or change of form. (Example, grasshopper.)	V. *Neuroptera*, (net-veined insects.)	Four wings of the same texture, with narro ted veins.
	VI. *Orthoptera*, (straight-winged insects.)	Four wings of dissimilar texture: the fo parchment; the hinder pair me folded lengthwise.
	VII. *Hemiptera*, (half-winged insects.)*	Four wings of dissimilar texture: the le ... the hind... the hinder pair ... veins.

Enough having been said, however, to give the young farmer idea of the orders into which insects are divided, and their chan s will now proceed to the remedies proposed either to destroy t n them from the plants or animals they infest. The subject is one portance not only to the farmer, but likewise to the consum... to have good and cheap necessaries of life.

To give some idea of the amount of damage done by ... merely cite two instances: Curtis, an English writer on the su insects, states that in 1786 the turnip crop destroyed by inse alone was valued at one hundred thousand pounds; and ...

* This includes also Homoptera of the former classification.

that in 1854 the destruction to the wheat crop, caused by the wheat
nted to over fifteen hundred thousand dollars. Considering the loss
crop alone caused by the ravages of only three minute insects, viz.,
idge, the Hessian fly, and the grain weevil, to say nothing of the
r crops and fruit, the most sceptical of unbelievers will be convinced
tance of instituting a regular series of inquiries and experiments in
roy them, and of making the results known to the public through
of the Report of this department, or the pages of local agricultural
t is true that many of the remedies already proposed by closet
r book farmers, are almost as absurd as old Pliny's receipt to make
bees, namely, that if the swarm is entirely lost it may be replaced
? the belly of an ox newly killed, covered with dung. Virgil also
s may be done with the body of a young bull, and in the same way
case of a horse produces wasps and hornets, and that of an ass,
iny III, 24.) In like manner, in our time, we see it has been
d to swathe or clothe the trunk of plum trees with cotton batting to
plum weevil from laboriously climbing up the tree to deposit her
plums, altogether ignoring the fact that the said curculio can fly,
ch the forbidden fruit much more rapidly and readily. Again, we
nended to put a roll of brimstone or flour of sulphur into an auger
i the trunks of trees to kill the caterpillars and insects which de-
iage; whereas any chemist knows that sulphur being insoluble in
t mingle with the sap, but remain unchanged and undiminished for
period of time. These two examples we have merely mentioned
absurd it is to recommend remedies without first inquiring into
the insect or nature of the plant.

COLEOPTERA.

ow commence with the Coleoptera, or horny-case winged insects,
which are mostly naked grubs of a white or yellowish color.
rnished with a distinct head, and some of them have six legs,
have no legs whatever; they live concealed under the earth or
ith the bark, and in the wood of trees, or sometimes upon the
nts and trees. In the pupa (or second state) they lie with their
closely to the body and pass that state in cavities made by the
tected by any silken web. The Cicindelidæ, or tiger-beetles, so
their activity, bright colors, and ferocity, in both the larva and
live by preying upon other insects; in the larva state they live
he ground, seizing and devouring any unfortunate insect which
to cross the opening of their dens. Boys frequently catch them
by inserting a stalk of grass into the hole. This is seized by the
arva, which is then suddenly brought to the surface with a jerk
e insect has taken firm hold.

t tiger-beetles are of bright metallic colors, and barred or spotted
white; they may be seen on any hot, sunshiny day running or
distance, and then alighting on the ground on roads and in sandy
The predaceous ground-beetles, or *Carabidæ*, are also beneficial, as
other insects and caterpillars. There is one of this family, how-
s *caliginosus*,) the habits of which require further investigation,
n accused of preying upon wheat; and what renders this charge
e is the fact that two European insects of the same family (*Zabrus*
Harpalus ruficornis) are said to eat grain. This large brownish
certainly is found in immense numbers under wheat stacks, but
frequent such situations merely for the sake of the shade, mois-
ll insects commonly found in these places. But in two instances

be strewed in rows in the field or garden as a bait for t
pieces to be examined every morning, and the insects whi
to be collected and destroyed; this, however, would be
very small scale. A writer in the Scottish Farmer sta
Pusey found rape cake had the effect of destroying n
worms, and when grass land is very much overrun with t
be advisable to pare and burn the sod. Moles, crows, an
mense numbers of these larvæ.

The perfect insect of the *Buprestis*, or borer, we find
somewhat similar in shape to the elater or click-beetle ab
much broader and generally of metallic lustre; it is also
wards when placed upon its back. The larvæ, which
flattened bodies suddenly widening towards the head, hav
the wood of the apple, cherry, hickory, peach, oak, a
remedies, cutting out the worms, &c., are recommended,
the apple-borer. Harris says "that when trees are very
larvæ it will be better to cut them down and burn imm
suffer them to stand until the borers have completed their
made their escape; also that woodpeckers are much m

-bug or stag-beetle is an example of this class. The spotted *Pelid-*
ever, a large, broad, oval, glossy, yellowish brown beetle, with six
ts on the wing-covers, is sometimes very injurious to the foliage of
-vine. Harris states that the only method of destroying them is to
1 off by hand and crush them under foot; this should be done early
rning when the beetles are somewhat torpid, as if disturbed in the
the day they are apt to fly away.

w come to a family of beetles which are very injurious to the farmer,
ying the roots of his grain and grass when in the larva state, and also
the foliage of his fruit and shade trees in the perfect or beetle state.
the true leaf-eaters or May beetles. The larvæ live under ground
years, (some authors state even longer,) feeding upon roots and veg-
atter, and are fat, clumsy, greasy-looking grubs, yellowish white in
h a yellowish brown head, and six legs. They generally lie coiled
semicircular shape, and have a large swollen hinder extremity.
ates that "the crow devours not only the perfect insect, but the larva,"
es called by the farmers the white grub,) "for which purpose it is
erved to follow the plough." Mr. Bartlett, from personal experience,
at their instinct also enables the crow to find the grub when deeply
in the soil, and has seen the holes from which the larvæ had been
this bird." Jays also feed upon them; the night-hawk, whip-poor-
domestic poultry destroy vast numbers of the perfect beetles; and
animals, hogs, weasels, rats, skunks, moles, and field mice also feed
m in the larva or perfect state. Köllar states that "breaking up the
1 warm weather, when the grubs are not deep under the surface, is
t means of destroying the larvæ of an allied species found in Europe."
erican Agriculturist also mentions an accidental experiment in which
g early in the autumn destroyed the grub-worm, and suggests that
might be turned over in February if the weather permit. A foreign
peaking of a grub having similar habits, states that "a farmer mixed
seed a quantity of guano equal to about one hundred weight to the
nd to be sown, and sowed by hand the seed thus prepared;" the land
ted did not suffer from their attacks, whilst other fields without the
re very much injured. Dr. Fitch says "It is not probable that any
e can be applied of sufficient power to kill the grubs without also in-
ie vegetation," and suggests that if the grubs are very numerous the
ested should be converted into a hog pasture.

ards the best means of destroying the perfect May beetle, Harris rec-
shaking the trees early in the morning over a cloth spread upon the
nderneath the tree, as the beetles at that time do not attempt to fly;
ich they may be scalded and given as food to swine. Mr. Bartlett
that "as they have a great penchant for lighted lamps and candles,
ld be lighted up in the fields in the evenings, into which the beetles
and be thus destroyed;" this remedy, however, was tried by a friend
d not to be very successful.

se beetle is becoming exceedingly numerous, and in some places where it
iously almost unknown is now very destructive to the grape-vine. The
ys about 30 eggs in the ground; the larvæ feed upon tender roots, and in
nn or beginning of winter descend deeper to pass the cold weather in a
id state. The perfect insect appears above ground in May and June; it
the foliage of fruit and forest trees, vegetables, grass, corn, and, in fact,
ıy vegetable substance in the shape of flowers or leaves. As the larvæ re-
ıose of the May beetle in their habits, the same remedies might be applied,
:t no special remedy has been recommended for destroying them in this
heir existence. With regard to the rose beetle in its perfect or winged
rris recommends hand-picking or shaking them into tin vessels con-

The rose beetles appeared to prefer the lighter colored c
perhaps, if roses of common varieties, that bloom profusel
vine blossoms, were planted as decoys or baits near grape-vir
ferring them as food, might more readily be captured and d
objection being that the roses might also attract rose beetl
ters which otherwise would not come. The common ox-ey
other flowers appear to attract immense numbers of them,
mon elder, which is said to be generally offensive to inse
is frequently covered with these noxious pests. Harris stat
are eaten greedily by domesticated fowls, but after a shor
served our fowls appeared to be either surfeited or else d
long, spiney, and sharp legs, and refused to eat them altogeth
said to destroy them. At present, however, the only rem
either hand-picking or shaking the perfect insects into a clot
filled with water. For every perfect female destroyed, su
hatch and complete their transformation, we may calcul
killed for another season. This should be done by the h
taneously in a neighborhood, as it is of very little consequ
beetles in a single small garden, whilst kind neighbors a

rfect insect appearing to be attracted by sweet substances like
ful green June beetle. Of this last-named insect I have ob-
zen to be collected in the space of about six inches on the bark of a
ly wounded, and from which the sweet sap was slowly exuding.
beetles do considerable injury to the ripe fig in the south by wound-
rowing into the fruit.

the beetles having the antennæ or feelers ending in a two or four
b, we find the so-called bacon beetle, injurious to dried meat and
isions. There are also several others of the hairy larvæ, which
is and feathers. These insects are also very destructive in collections
history and dried insects. The best means of exterminating them
mological cabinet we have found to be the free use of the strongest
izine applied in the boxes every two or three weeks. Camphor and
ive also been recommended for the same purpose, but are much
sive. The large yellowish brown and black carrion beetles, found
mals, also belong to this family, but do no harm. The short-winged
monly known as rove beetles, have such very short wing-cases,
nly a part of the abdomen or hind body, that by young entomolo-
would scarcely be classed among the sheath-winged insects. They,
e not injurious, many of them being even beneficial as preying on
s.

come to the water beetles, which are easily distinguished by their
and hind legs fringed with hairs, most admirably adapted to swim-
ese insects mostly pass the larva state in the water, and the perfect
ough generally found on or under the water, is able to fly from pond
This is generally done at night, or during damp, cloudy weather.
t to which they sometimes fly is very great, one of the largest spe-
been found on the flat roof of a building six stories in height. The
beetles seen sporting on the surface of the water, dancing, as it
gular circles, present a somewhat singular structure of the eyes, as
ss four, two of them arranged so as to be above the surface of the
two of them below. We have frequently seen them capture and
er insects, which accidentally have fallen into the water. All this
beneficial, as destroying aquatic larvæ and insects, although some
er species are said also to destroy fish spawn.

l worm, found in flour and meal, is the larva of a blackish brown
tle. These meal worms are much used in Germany by bird fanciers,
commended as food for the nightingale, and would be excellent for
rds and other soft-billed insectivorous birds when kept in cages in
r. These meal worms are preserved in covered stone jars filled with
, old meal, flannel, &c., and may be bred and used as required.
sting meal or flour the larvæ may be separated from it by sifting
ine sieve, and if very numerous artificial heat might be used, as
in weevil.

k, ash gray, and striped potato fly, or cantharis, injures the foliage
ato. Harris states that they may be destroyed by brushing or
m the plants into broad tin buckets or basins partly filled with water
all portion of turpentine, or caught by sweeping a deep muslin net
lants, and then emptying them for one or two minutes into scalding
hen properly dried they may be used instead of the European
or sold to druggists. We hear, however, that "unleached ashes or
lime sown upon vegetables whilst the dew is on them," although
listasteful to insects, would be of little use with the cantharides.
se live under ground, probably on roots, and are of a slender, de-
m, and possess six legs.

I now take up the curculionidæ, snout beetles or weevils. The heads

of these insects are always more or less prolonged into the shape of a sno proboscis, armed at the extremity with jaws for biting. The larvæ hav head indistinct, are almost always footless, and live generally in fruit, s and vegetable substances. The common whitish grub found in plums, c nuts, and acorns is a good example of their form and habits. The de tive curculio or plum weevil belongs to this family, and perhaps mor been written about this insect and remedies proposed than for any othe not only attacks the plum, but also the nectarine, peach, apple, pear, ch quince, and, according to one author, the walnut also. The eggs are dep singly in a crescent-shaped incision made by the proboscis of the fem and under the skin of the fruit when small. The larvæ when hatched bu obliquely into the fruit, penetrating to the stone, causing the fruit to drop ground. It then enters the earth, and the pupa is formed under ground. first brood appears about three weeks after the larva has entered the gr and the late broods pass the winter as larvæ according to Dr. Harris; b Fitch, when speaking of the insects affecting the trunk, bark, and limbs pear, in the New York State Agricultural Report for 1856, says that "t which are hatched in the latter part of the season, finding no young f which they can deposit their eggs, are obliged to resort to the smooth bark of the branches of our different fruit trees, and the worms from eggs repose *in*, not under, the bark through the winter, and produce the b which appear the following June, and oviposit in the young fruit." The been considerable difference of opinion on this point, some stating that th main as grubs all winter in the earth; others say that the pupæ are for the autumn, and remain as such under ground until spring; whilst oth of the opinion that the perfect beetles themselves hybernate. We ca say that, although for several years the bark of trees, under stones, and places have been thoroughly searched, as yet not one true plum wee been found, while several other insects are very numerous even in the of winter in such situations. Should it, however, prove that neither larv pupæ remain under ground all winter, the application of salt or any substance during the spring would prove useless. As regards destroying t fect insect, Dr. Harris says, "Let the trees be briskly shaken or str jarred every morning and evening during the time the insects appear beetle form. When thus disturbed they may be caught in a sheet spre der the tree, from which they should be gathered into a large, wide-m bottle or other tight vessel, and be thrown into the fire." A friend stat he has been very successful by jarring the trees at midnight, when the are collected on them; also, keeping the fruit covered with a constant wash with a little glue added to it, which is applied with a syringe as o is necessary, has been recommended. All fallen fruit should be immed gathered and thrown into a tight vessel, and after it has been boiled or st to kill the enclosed grubs, may be given as food to swine. A very stro coction of quassia bark is said also to protect the plums from the stings or tures of the curculio. If, perhaps, a little soap were added, it would ma liquid spread more evenly upon their smooth and waxy surface. Mr. mings, of the New York Observer, recommends syringing the trees with ture of four gallons lime-water, four gallons tobacco-water, one pou whale-oil soap, and four ounces of sulphur. The tobacco and water in so Dr. Fitch thinks good, "but the other ingredients add nothing to the v the mixture." A somewhat similar mixture is recommended in the C natus, as also sulphur, lime, and hot water. These mixtures must be a from the beginning, when the fruit is first formed, until the curculio disap and renewed whenever washed off by heavy rains. "Hanging elder in the plum trees" has also been recommended, but has no effect wh Such remedies as "bruising the tree so as to arrest the gum, which will

om the wounded place and prevent its going to the fruit, thus cutting off at he supposes to be the food of the larvæ," "entrapping the curculio in ttles of sweetened water," and "swathing the trunk with cotton batting to vent the insect from ascending the main trunk," may be classed with ny's recipe for making a swarm of bees out of an ox, already spoken of.

Ohio Farmer says that accidentally a bottle of coal oil was broken, and dust in which the bottles were packed was thoroughly saturated with is sawdust being put at the foot of a plum tree about the time of blos- ing, the fruit was saved. This circumstance led to further experiments in like favorable results.

A practical horticulturist, Mr. Saunders, upon whose judgment we place h reliance, tells us, in support of this statement about the coal oil, that observed the plums on the portion of a plum tree hanging directly er a shed recently covered with coal tar were not attacked by the curculio, lst on other parts of the tree the fruit was very much injured. It has also stated that trees to the branches of which pieces of cloth dipped in coal , or in whose branches open, wide-mouthed bottles of coal tar have been sus- ded, are avoided by the plum weevil; but we can only state from our own per- l observation that, in our immediate vicinity, the forest trees near a gasometer gas-house appeared to be as much infested with caterpillars and other in- cts as the rest of the grove. The remedy may, however, be tried, with the on that gas tar, if put upon trees, is said to be injurious. As nothing has ap ared of late about Mr. Mathew's celebrated curculio remedy, we suppose the thing has died a natural death. Mr. C. Schultz recommends burning gas tar in pots under the trees, the smoke of which will drive the curculio away; and it is well known that a dense smoke of almost anything to the windward of trees will drive all the insects off, for the time only, however, that the smoke lasts. In the Cultivator of 1862 we find it stated that "gas lime, which can be pro- cured at any gas works, is a sure protection from the attacks of the curculio, if scattered among and upon plum trees while in bloom, and continued immedi- ately succeeding a rain." In 1863 the same journal says, that "air-slacked lime" (others recommend unleached ashes) "dusted over the young fruit will have a tendency to prevent the attacks of the plum weevil, and air-slacked lime, with a small quantity of fine salt, sowed beneath the trees, will destroy a great number of insects in the ground." It has been believed that plum trees planted over water are not subject to the attacks of the curculio. Such, however, is not the case, as tested by an experiment of Dr. Fitch, where the fruit wilted and dropped into the tanks placed under the trees. The fruit dropping into the water, however, will drown the larvæ enclosed in it, and thus decrease their numbers. Dr. Fitch recommends all fruit to be picked up and either burnt or given to swine; and that when jarring (not shaking) the trees, soon after the blossoms have fallen, in order to prevent the bark being bruised, it would be well to place a strip of carpeting or coarse cloth against the tree to receive the blows; others recommend the mallet or club itself to be covered with car- peting, and when the fallen insects have been collected in the sheet underneath, to burn or otherwise destroy them. The whole contents of the sheet must be burned, as the curculio, when feigning death, resembles nothing so much as a dried and dead bud, and if care is not taken will be thrown away as such. This has frequently been the case in our own experience. Hogs are said to be very useful in a plum orchard where the trunks of the trees are protected, so that the swine cannot rub against them and thereby loosen the roots or bark; and if something were planted that the hogs could root up to feed upon, or corn widely scattered over the orchard, they would be induced to root up the earth in search of their food, and all fallen fruit, with the grub in it, would inevitably be found and destroyed. Neighbors should join in their endeavors to eradicate this pest, as the curculio can fly from one orchard to another in quest of plums. Pavi

the tree around the roots and under the branches, or making it impervi
the grub when leaving the fallen plum, has been recommended. A he
chickens placed under a tree are very beneficial, especially if the tree
quently jarred by persons passing by, the beetles falling to the ground,
they are eagerly seized by the chickens. Indeed, several persons have
that where plum trees have been planted in a hen or hog yard the fru
been preserved intact. Quick or unslacked lime strewed upon the surf
the earth underneath the tree in the spring, after the frost has come out
ground, is said by some to be efficacious in destroying the curculio as it
from its subterranean winter retreat.

The plum knot, which infests the plum tree and the morello cherry, wa
by some to be caused by the curculio, and by others by a species of ke
It is now found to be a vegetable or fungoid growth, and was described
L. D. Von Schweinitz forty years ago under the name of *Sphæria mo*
The knot commences with a visible enlargement and swelling of the
This afterwards increases until it breaks the outer skin, subsequently ass
a black, rough, warty appearance. It is true that this knot, if cut ope
frequently be found to contain not only the grub of the curculio, but li
several other larvæ and insects. This, however, is merely the effect, an
the cause, of the disease, the curculio finding in this swelling of the bar
place to deposit her eggs. Thick-skinned plums are said to resist the a
of the curculio much better than the thinner-skinned varieties, the Lo
having the reputation among some of being almost curculio proof; but w
it is so or not we are unable to say.

In the neighborhood of Washington several oak trees are covered with
or knots similar to those on the plum, only much larger and more woody.
are found only in peculiar localities and on particular trees, sometimes hu
of yards apart from each other, the knots frequently appearing on one limb

Cutting out the knot or wart, and afterwards covering the wound with
varnish, has been recommended as a cure; but in our own experience this
serves as a temporary remedy. Even when the wounds had been washe
a strong dilution of nitric or sulphuric acid and water, the disease inv
appeared either above or below the old scar, and frequently broke out in
parently healthy branch. At length the knot appeared on the trunks, a
trees had to be cut down as useless and unsightly. The American Agricu
for 1863, however, says the knots should be cut off two or three times
in June, July, and September, being always careful to eradicate every p
of the fungus, for if a solitary uninjured cell be left it will rapidly incre
if it were a spore, and will soon break out again. In the mean time
trunks and larger branches of the trees be thoroughly scrubbed with strong
say twice during the season, to destroy any spores that may have lodged
bark, and at the end of three years this pest will have become almost e
exterminated. Some varieties of the plum appear to be more liable to
ease than others. In our own orchard the frost plum or gage was affect
worst. Mr. B. D. Walsh, in the Prairie Farmer, describes another weevil
ing the plum and crab-apple, under the name of the plum gauger, as it
into the plum not only to deposit its egg, but also for food, forming t
round holes down to the very kernel, varying in size from a pea to a
seed." No method of extirpating this insect has been suggested, but the
dies recommended for the injury caused by the curculio might be of utility
its habits prove to be the same.

Where only a few plums are wanted to be preserved as specimens from
graft or bud, we have frequently cut out the egg of the curculio with th
of a penknife, and thus saved our specimen.

The northern granary weevil and the southern rice weevil differ very
form to the casual observer, the latter being merely smaller, and havin

a spots on the wing cases. Curtis states a curious fact, that the granary
il in England "is destitute of the organs of flight, whilst the rice weevil has
r of serviceable wings." Both of them are very injurious to grain and corn.
he rice weevil is very destructive to the southern rice. The egg of the
ern granary weevil is deposited on the grain; the larvæ burrow inside
eed upon its inner substance; the perfect weevil makes its escape from a
hole bored through the outer skin. Curtis says, "it is calculated that
individuals may be reared from one pair of European weevils in one sum-
Dr. Harris says, that these insects "are effectually destroyed by kiln-
g the wheat; and grain that is kept cool, well ventilated, and frequently
d, is said to be free from their attack;" also, "by winnowing and sifting rice
e spring, the beetles can be separated, and should be immediately gathered
lestroyed." Curtis states that "placing the grain in close cellars is the
t of all proceedings, as the weevils delight in darkness and being undis-
d." He recommends "frequently stirring or turning over the heaps of
t;" he also says that the scent of spirits of turpentine, or the fumes of
ur, did not appear to incommode the insects;" but in an experiment tried
urselves in 1854 or 1855, the odor of a few drops of chloroform killed both
and weevil in some closely corked bottles of samples of wheat in the
cultural Department; the same bottles being opened a year afterwards, re-
d the scent. Benzine would, perhaps, have the same effect, and be much
per, but, most probably, would also impart a nauseous taste and smell to
rain. Wheat kept in bottles, thus treated with chloroform for a week,
inated when planted.

rtis says that "the larvæ as well as the weevils are destroyed at 190°
enheit, but it also scorches the grain;" and that "a room heated to 130°
ot-water pipes has been constructed in Madeira, which answers every pur-
" and "wheat subjected to this high temperature vegetated in the ground."
lso says "that fleeces of wool laid on the grain heaps attract and kill the
ts." A larger weevil, called the hunter-weevil, has been much complained
certain localities, as eating the leaves of corn. A very similar insect is
l near the Pedee river, in South Carolina, the larva of which feeds in the
of corn, thereby entirely destroying the plant. This is merely mentioned
rn farmers, in case they should find individual plants among their corn
ering, and in a yellow, sickly state, that perhaps the larva of a hunter-
il, or one very nearly allied to it, may be the cause of all the damage.
only remedy at present recommended is hand-picking and burning the
ed plants. Another curculio (*Epicærus fallax*) is very injurious in the
borhood of Washington, in the weevil or perfect state, to the leaves of
g cabbages, clover, and various other plants. It appears, however, to be
as we have received no complaints about it, except from Iowa, where it
es the foliage of the cherry and apple trees, and gooseberry bushes also.
emedies, however, have been recommended, as its habits have not been
investigated. We, however, have caught great numbers when sweeping
a bag net over clover fields.

ie larvæ of the white-pine weevil injure pine trees by boring into the lead-
shoot, thus destroying the growth and symmetry of the tree. Harris
mends "the injured leading shoot to be cut off in August, or as soon as
perceived to be dead, and to burn it, together with its inhabitants." The
of the pitch-eating weevil, and others, devour the substance under the
of pine trees, and perhaps the method used for decoying the pine-eating
es in Europe may be practiced here with advantage. This consists in
ing some newly cut branches of pine trees in the ground in an open space
g the season when the insects are about to lay their eggs; in a few
these branches will be covered with the beetles, which may be shaken in
th and burned.

The weevils inhabiting nuts, acorns, chincapins, and chestnuts, are distinguished by their very long projecting and slender bills or trunks. The egg is deposited in the young fruit, and the grubs are found in the interior. They afterwards enter the earth and change to pupæ and perfect weevils. No remedy has yet been found.

The pea weevil destroys the interior substance or future seed-leaves of the pea, seeds of locust and other leguminous plants. The egg is deposited singly in punctures made by the female, on the pod. The larvæ, when hatched, penetrate through the pod and bury themselves in the pea opposite the puncture where they eat the interior of the pea. The pupa is formed in the pea itself and in spring the perfect insect comes out of a round hole eaten through the skin. Many of these worm-eaten peas will germinate, as the germ is seldom injured by the larva. Latreille and others recommend putting the seed peas in hot water a minute or two just before planting, by which means the weevil will be killed and the sprouting of the peas be quickened. Curtis states that "an immersion of four minutes in boiling water will kill almost all the pea." The American Agriculturist, 1860, says "that the water should not be above 170 to 180° Fahrenheit." Late-sown peas escape their attacks, and if planted as late as the middle of June, are seldom infested with this weevil. If peas are kept over the year, they are free from this pest, the beetle having deposited them. Mr. Curtis states that "kiln-drying at a heat of 133 to 144 degrees will kill the insects without altering the quality of the pulse, but such seed will no longer vegetate."

The New York weevil is a very large curculio of a gray color, marked with whitish lines and black dots. It destroys the buds and gnaws the young bark of the pear, plum, cherry, maple, oak, &c. As they are not very numerous yet, and appear to be local, no remedy has been proposed. Hand-picking or shaking them off the trees in a similar manner to the plum weevil will answer, if they should increase so as to become very injurious.

Many of the small bark beetles destroy trees, by eating holes in the soft substance of the bark. Familiar examples of their work may be seen in almost any old dead tree or fence-rail. When the bark is removed it exposes singular parallel passages or galleries diverging at almost right angles from the main stem or shoot. Other passages eaten by these insects look like rude irregular printing or drawings. These bark beetles injure apple, pear, cherry, elm, pine, cedar and other trees. The pear-blight beetle is sometimes very destructive to pear trees, causing the branches to wither and die in a apparently unaccountable manner. The egg is deposited probably behind the root of the bud on a twig, in July or August. The larva or grub eats from the heart of the bud through the sap-wood to the heart-wood, afterwards forming a circular burrow in the heart-wood, thus cutting off the circulation of the sap. The pupa is formed at the bottom of the burrow, and the perfect insect appears from June to August. Dr. Harris says that "the remedy, as suggested by Mr. Lowell and Professor Peck, to prevent other limbs from being subsequently attacked in the same way, consists in cutting off the blasted limb below the seat of the injury and burning it before the perfect insect has made its escape. The trees should be examined daily in June, and every blighted limb immediately cut off. The injury caused by this insect being merely local, should not be confounded with the real fire blight of the pear, which appears to be a constitutional disease of the tree, caused, some say, by atmospheric influences and others by severe winters. Dr. Berckmans says "it is owing to the unhealthy condition of the tree, bad or improper soil, too much moisture, sudden variations of the temperature, (we have observed several of our trees suddenly affected immediately after a severe thunder-storm,) and incompatibility of graft and stock." In the Cultivator of 1862, it is said to be a cryptogamous plant. Mr. Walsh, in the Prairie Farmer, thinks a blight can be caused

nade in the tree by a species of leaf-hopper to receive their eggs. inders, and other materials dug in the ground about the roots, have mended by many. But Mr. Saunders states it to be caused by ex- poration in early spring, or late winter, when the ground is frozen ion from the soil by the root is impossible, whilst at the same time is progressing in the upper part of the tree. He recommends e roots in early winter with a few inches of charcoal dust, which r prevent the penetration of frost. He likewise states that cutting all discolored wood is removed, will cause the plant to recover. k beetles infesting other forest and fruit trees, Köllar, in Europe, we should encourage woodpeckers and tomtits." Titmice or chicka- old-crested wrens, in this country, destroy numbers of them, as the their stomachs will testify. One of this family of beetles was stated use of the disease called the "yellows" in the peach, but this is said stake. Others having dissected the trees affected and finding no e that the injury is caused by vitiated sap, and that the insects are id not the cause of the disease. Trees in a feeble or unhealthy e almost invariably the first attacked by the larvæ of bark or wood

æ of the long-horned beetles, the perfect insects of which do much he wood of trees, are distinguished by their very long antennæ, elers. These larvæ are generally of a whitish or yellowish color, ished with six either very short legs or none whatever, and a flat with strong jaws. We find familiar examples of this family in and locust borer, oak pruner, &c. The larva of the destructive orer is a footless white grub, in shape somewhat broadest towards hich is of a chestnut brown color. The perfect beetle is also of a own, having two longitudinal white stripes on the wing cases. The osited on the bark near the root in June and July. The larva wood, and remains in the larva state two or three years; when eds under the bark, forming and enlarging the cell it makes there, tinues for some months; it then attacks the heart-wood.

ested by these insects should be examined about September, and lored spot is found, varying from the size of a five-cent piece to a probable that a grub will be discovered; it can easily be dug out p-pointed knife, as it lies directly under the bark; but if the worm ted deeply into the wood, other remedies have been suggested, such the hole with a slender sharp-pointed wire or whalebone, thrusting pierces the worm, and when, if withdrawn, the end of it is found t is highly probable that the borer is pierced and will perish. Plug- le with camphor and cotton or sponge pellets saturated with cam- ne, turpentine, and other strong-smelling substances, then stopping th of the hole with putty or yellow soap, has been recommended; ng boiling water into the holes by means of a syringe. It is best, seize time by the forelock, and prevent the eggs from being de- ll; to do so, the trunks of the trees should be first scraped, if the h, early in June, when the insect lays its eggs, and then scrubbed ith one pound of whale-oil soap to one gallon of water; (soft or com- ap will do if whale-oil soap is not to be procured.) This should ticularly near the base of the tree, and repeated whenever washed . Bandaging the trunk two or three inches below the earth and es above ground with coarse muslin, thick paper, paper tarred, or he outside, are said to be very useful in keeping the female from ier eggs. The Cultivator of 1863 recommends heading down the ugh to shade the trunk; softsoaping the trunk is also advised.

trees are very much injured by a borer which is also the larva

branches in the autumn and burn them, when the insects
sarily perish in the flames.

When in Iowa some years ago we found a long-horne
Prickly Leptostylus, to be very destructive under the ba
The beetle is rather more than the third of an inch in leng
under the bark; the pupæ are formed in oval nests of woody
the bark; and the perfect insect comes out in July and Aug
recommended is to examine the discolored places in the ba
larvæ; perhaps softsoaping the tree would prevent the fen
eggs, as advised for the real apple borer. The larvæ of s
beetles are very destructive to the wood of oak, maple, pine
other trees; but these we shall pass over, as the remedies
will also do for them. There is one, however, that must rec
as injuring the stems of raspberries and blackberries. Thi
punctata, of Melsheimer's catalogue. An egg being deposite
on the stem near a leaf or small twig, the larva when hatc
pith and causes the stem to wither and die. To eradicate t
affected should be immediately cut down and burned.

The small leaf-eating beetles constitute another family, m

about a quarter of an inch in length, of a rusty buff or orange
b stripes on the wing covers. Harris recommends "brush-
m. leaves into shallow vessels containing salt and water or vin-
ashes strewed over the plants are said to destroy the larvæ.
number beetle is smaller than the potato beetle, and is of a
w or with three black stripes on the wing covers. Their larvæ
the ground, and it is the perfect beetle that injures and feeds
There are two flea beetles that are very injurious to young
, eating innumerable holes in the tender first leaves, often kill-
s. One is of a black color, and the other is marked with two
of yellow on the wing covers. In regard to a similar insect in
destructive to turnips, Curtis says that the females lay two hun-
y to three hundred eggs; the larvæ also feed upon the leaf; the
in the ground all winter, and the perfect insects or beetles fly by
the wind. As the same remedies will apply to the striped cucum-
both the flea beetles, we will proceed to enumerate them. Dr.
sprinkling the vines with a mixture of tobacco and red pepper,
er, lime, plaster and superphosphate or guano, charcoal dust, Scotch
d or coal ashes; nay, even common dry road dust has been recom-
sprinkled over the plants when wet; also watering the plants
n of one ounce Glauber salts to one quart of water, tobacco-water,
common and whale-oil soap, an infusion of elder, walnut leaves or
y or wormwood tea, aloes and water, lime-water, or a strong infusion
bark, sprinkled over the plants with a watering-pot, will, it is said,
leaves so nauseous as to prevent the insects attacking them. When
are placed singly in hills, like cucumbers, "pieces of paper or cloth
with kerosene oil," or "sticks of wood, the upper parts of which have
d with coal tar or oil, set in the ground near and around the plant,"
repel insects.

many cucumbers are raised, it is also the practice to sow plenty of
rst, and then at four or five successive periods planting more seed
hose first planted, so as to supply the insects with abundance of
d to feed upon, when the stronger growing plants remain untouched.
est plan appears to be to protect the young hills with small boxes
quare and six or eight inches high, without bottoms, and with the top
ith gauze or millinet, until the plants are large enough to need no
. Loose cotton batting pegged over the young plants is said to pro-
in a similar manner. Harris recommends sweeping with a bag-net.
it be improved by forming the net somewhat like a fyke or fishing-
g the first (strong cotton or linen) bag fixed to a hoop somewhat
id funnel-shaped, ending in a tubular case made of tin, having a hole
t can be placed, and a second bag, much longer, affixed to the
, also ending in a small hole with a similar short tin tube, closed also
When in use the inner cork is taken out, the net or bag is swept
over the plants, and all the insects caught must necessarily pass
d bag through the hole, which may then be stopped with the
n full the bottom cork can be taken out, and the enclosed insects
hot water without the danger of losing the most of them, which we
ly experienced when sweeping with a single long sweep-net or
e t t when used over grass the large bag would be partially
ass ds, but none of the insects captured would be able to escape.
over in the fall is also recommended when the insects are very
cucumber fields. Hens and chickens destroy a great number.
n, and we found at least twenty striped cucumber beetles in
phœbe bird shot some time ago.
insect similar to our flea beetle in England at

turnip, Curtis says, "that the rapid growth of the plant is
sowing plenty of seed is requisite; that burning is beneficial; a
doubtful, but probably good in wet weather; watering with weak or
ficial." He also advises the use of a bag-net, and says "that the
quicklime, coal ashes, and soot has been attended with various succ
rally with beneficial results. Brushing the fields with elder is
useful."

The larvæ and perfect insects of the steel-blue grape-vine beetle
times very injurious to the grape. They also attack the plum, elm,
trees. Harris says "the careful and systematic use of lime will ob
great degree the danger which has been experienced from this insec
that lime, if dusted over the plants when wet, (others say when dry,)
ing them with an alkaline solution of one pound of hard soap to ten
soapsuds, is beneficial. Köllar says an infusion of the tea of wormw
decoction of walnut leaves (perhaps strong quassia tea might answer)
vent the beetles from touching the leaves. Others advise the use of
bag-net, already mentioned, or syringing the plants with whale-oil
water.

A beetle very destructive to asparagus has made its appearance
island, and, if not checked, will ultimately spread over the country.
insect is found in Europe. Köllar recommends hand-picking; and it
stated that a hen and chickens will exterminate them if placed in a c
the beds. The larvæ of the elm-tree beetle destroy the foliage of the
especially of the European. The eggs are deposited in clusters unc
in May and June; the larvæ or grubs eat the soft inner substance of
causing it to assume a scorched appearance, as if the tree had been
to fire; these larvæ then descend by the trunk and form pupæ on
near the trunk. The perfect beetle appears in July, and lays eggs for
brood, to destroy a second crop of foliage. A correspondent of the
Agriculturist for 1863 states that an English elm tree that had holes
the trunk, and the holes then filled with powdered corrosive sub
plugged with wax, was untouched by the beetle for six or seven ye
editor is sceptical as to the benefit, and we ourselves very much do
utility of any such remedy. In Washington, D. C., tobacco-water h
used to syringe the trees, (some say with good effect;) but it does not
to save them, as many trees have been cut down on account of thi
We have observed, however, that when the larvæ of the first crop
they almost invariably come down by the trunk, and in a day or two
into motionless, yellowish pupæ on the ground, very near the trunk of
where they remain for several days in a quiet and helpless condition.
the time to attack them, when they lie in heaps like grains of wheat
circumference of three or four feet immediately surrounding the main
the tree; handfuls of them may be picked up near the root of any l
fested elm. A tight enclosure of boards, about one foot in height, wit
the top of it to prevent the larvæ from crawling out, might be put arc
trees, say one or two feet from the trunk, the ground well consolidate
this enclosure, and every morning during the season of their metam
thousands of motionless pupæ might be destroyed by lime, hot water,
similar means. It is of no use, however, to do this to a single tree
are other infested elms near, as the perfect beetles are able to fly to
erable distance.

A leaf-eating beetle, commonly known by the name of the
man, has done considerable damage to the foliage of the
other parts of the west. Mr. B. D. Walsh states
eggs early in the summer; their larvæ feed voracio
the green leaves. The pupa is formed under grou

ison. He advises farmers to syringe the infested plants with tobacco
in strong lye, or some other offensive mixture; perhaps a strong decoc-
of quassia wood would answer. We have found a similar insect on the
on horse nettle in Georgia.

now come to the family of ladybirds, or bugs, as they are incorrectly
.. All these (save one species) may be considered highly beneficial to
iculturist in both the larva and pupa state, as they destroy myriads of
, and bark lice, and other insects, which, if left unchecked by this and
predatory insects, would multiply so fast as to destroy almost all vegeta-
. We have seen one species, *(Chilocorus bivulnerus,)* black, with two red
on the wing cases, busily employed in the spring tearing open the cases
ne bark lice on pines, and devouring the eggs deposited beneath them.
ther species destroys the orange bark louse. We have even seen some of
ladybirds pierce the skin of newly changed chrysalides to feed upon their

There is one of this family, (the spotted squash beetle or bug,) how-
tne larva and pupa of which are very destructive to the foliage and flowers
squash, melon, and cucumber plants. The eggs are placed in irregular
ups or clusters on the under side of the leaves. The yellow larvæ are cov-
l with branching spines. The pupa is formed in the thorny skin of the
a. This injurious ladybird may be readily distinguished from the bene-
ladybird by its larger size, more yellow color, and by having seven
dish, black spots on each wing cover when closed, and four smaller spots
the thorax or middle part of the body. Mr. Uhler recommends sweeping
a from the plants with a net; and perhaps, if the same remedies were em-
yed to make the leaves distasteful to the insects, as recommended for the
ped cucumber beetle, they might be found to answer.

his part (No. 1) concludes an account of the remedies already proposed and
ticed for the destruction of the coleopterous insects or beetles. As the
le subject would occupy too much space in the present volume, the other
rs, viz., the grasshoppers, dragon flies, wasps and hornets, butterflies and
plant bugs, plant lice, and flies, will necessarily be deferred until the
eport of 1864.

TOWNEND GLOVER.

Hon. ISAAC NEWTON,
Commissioner of Agriculture.

REPORT OF AGRICULTURAL STATISTICS.

AUGUST, 1864.

SIR: In laying before you my first annual report of the statistical division
the Department of Agriculture, it is proper that I should refer to the objects
posed to be accomplished by it. Aside from some of a minor and incidental
, the principal are:

1. The collection of agricultural statistics showing the condition and amount
the crops at brief intervals, monthly or bi-monthly, as the interests of
culture demand. The object of these statistics, and the plan adopted for
collection, are stated at length in the accompanying report.

The collection and arrangement of such statistical matter as exhibits the
rce, both foreign and domestic, in the leading agricultural products;

that, having the tables always at hand, and understanding from fluence of this commerce on prices, the farmer may intelligently di to the culture of such crops as the statistics indicate will be most in

3. The collection of information on all subjects connected with ment of agriculture. This information is obtained through ci correspondents, in which inquiries are made as to the condition the various crops, and also of the causes of success or failure. of space in the present volume, the following report embraces no topic character, but they are published in the bi-monthly reports, and prominent place in the next annual report from this division.

4. In order to accomplish the foregoing objects it became in necessary to publish a monthly report. This was done during the fall of 1863, after which it was changed to bi-monthly, because retu circulars could not be had in time for a monthly.

Through these reports the condition and amount of the cr before the country quickly, that the grower of and the trader in products might base commerce on them by the law of supply and d their influence has everywhere been acknowledged as beneficial to not less so to the consumer. They have been distributed to cor who reply to the circulars, and to their assistants; to agricultural s members of Congress, and to all persons desiring them.

With these brief references to the leading objects sought to be ac by this division, I pass to as brief a statement of the general topics in the following pages. They are:

1. A notice of the plan adopted for the collection of statistics of t products of the farm, as compared with those in use in England an

2. The tables for each of the loyal States, exhibiting estimates m cordance with this plan, of the amount, acreage, price, and value of crops, with a summary of the amount, acreage, and value of each cr amount, acreage, and value of all; their increase and decrease, an cent. of these, for the years 1862 and 1863; also, a table of the farm stock in January, 1864.

3. Tables of the exports of the principal agricultural product States, their prices at New York and in England; the receipts and of them at the two principal centring points—Chicago and New their prices at these cities.

LEWIS BOLLMAN, *Sta*

The COMMISSIONER OF AGRICULTURE.

PART I.—THE PLAN ADOPTED FOR THE ANNUAL COLLECTION OF THE THE CROPS AND THE AMOUNT OF FARM STOCK, BY THE AGR DEPARTMENT, WITH A NOTICE OF THAT IN USE IN ENGLAND AND

The commerce of the world is so dependent on agricultural produ to ascertain their annual amount has become an object of the great No less dependent on them are manufactures, and all the industry therein. The textile material, as cotton, wool, and flax, is essen great clothing manufactories, and the animal, cereal, and vegetal sustain the health and strength of their operatives. A scarcity o their abundance, affects the exchanges of the world. In view of th dependence on agricultural production, the nations of the earth, espe like England, which do not supply their own wants by their own or like Prussia and the United States, which largely export agricultur to the manufacturing nations, are forming plans to ascertain the yi annual harvests.

modes adopted have several objects in view. One, as the decennial
of the United States, aims to ascertain the general progress of the nation
direction. Another, as the fifth-year census of Massachusetts, has the
ject in view, but to determine these at shorter intervals. A third mode
in the annual censuses of several of the States, as of Ohio, Iowa,
, and California, which, to the objects already named, add the additional
ecting the course of agricultural and manufacturing industry by
out wherein lies its excess or deficiency. A fourth one goes yet
and endeavors to estimate the amount of the crops before they have
from the hands of the producer, that he may reap the just reward of his
price greater or less, as the annual production may be small or great.
s not only to show the general progress and direction of agricultural in-
but the *market values* of its productions.

reat Britain.—In this nation, where agriculture has attained such high
on, no mode of ascertaining its product, established by law, exists.
mers of England oppose it, whilst those of Scotland favor it. Attempts
een made in Parliament to establish one, but as yet unsuccessfully.
nly result has been to elicit the reasons of this hostility of the English
, which, so far as we have seen them, are refuted by experience here.
the absence of a national mode, the Mark Lane Express has endeavored
ly the want of it by its own enterprise. We, therefore, refer to its plan
English mode.

s issue of February 8, 1864, we find its report of the cereal crops for
wheat, barley, oats, and potatoes, and in that of February 22 for the
f beans, peas, turnips, and mangolds. To exhibit the plan adopted by
press we take its introductory remarks, and its return of the first-named
or the county or shire of Devon, and that of the last-named for the
of Bedford.

Express says:

rding to our annual custom, we present in to-day's impression a tabular view of the
f the harvest of 1863, the substance of more than six hundred letters from all parts
nd, and from the most respectable and reliable authorities. In another table will be
condensed view of these results, bringing them into a few lines, and showing at one
e most correct estimate of the actual produce of the country that can be obtained, so
e principal articles of human food are concerned. The remaining crops will be
f in a future number of the paper."

this "condensed view" we take the returns for the counties of Devon
Bedford, that the reader may clearly see their character. The names
g the county are the places from which the returns are made:

An estimate of the yield of the crops of England for 1863.

County.	Wheat.	Barley.	Oats.	Potatoes.
DEVONSHIRE.				
Bampton	Three quarters per acre; this is over average, and quality good.	Four quarters per acre, two-thirds stained by the wet.	About an average, of good quality	Good crops, quality never better.
Barnstable	Four quarters per acre, the yield and quality good.	Four to six quarters per acre, weight 52 to 56 pounds, and bright.	An average, 36 to 40 pounds per bushel.	An average, and little diseased.
Bideford	An average, say from two to three quarters per acre.	Average, say four to five quarters per acre.	Four to six quarters per acre	An average, not much diseased.
Chumleigh	Twenty bushels per acre, of good quality	An average crop	An average	Over average, early sorts half diseased.
Coombe	Two and a half quarters per acre	Three quarters per acre	Four quarters per acre	Fair crop, half diseased.
Crediton	Full one quarter above average, and very good crop.	Over average, and good quality	Five to six quarters per acre	Good crop, one-third diseased.
Hollacombe	Two and a quarter quarters per acre, or an average.	Three quarters per acre, or under average.	Three and a half quarters per acre, or under average.	Best crop for eighteen years.
Holsworthy	Average crop, in some places damaged by the weather.		Very light crop, straw spoiled with wet.	Good crop.
Honiton	Considerably over an average	Over an average.	Over an average	Best crop for many years.
Lamerton	Over average, (say twenty bushels per acre,) very good quality.	Over average, thirty-five bushels per acre, quality good.	Yield and quality good, straw deficient.	Better than for many years.
Ottery St. Mary	Considerably over the average, or three quarters per acre.	Over average, or five quarters per acre.	About an average	Over average, but half diseased.
Plymouth	Good in quantity, condition damp, quality weak.	Quantity good, quality inferior	Good in quantity and quality	Quantity and quality good.
Plymouth	Above average, damaged by the wet harvest.	Quantity an average, quality bad	Above average, but soft quality from wet.	Good crop, disease as usual.
South Molton	A good crop.	Good crop	On the whole pretty good	Generally good, but turn bad in pits.
Tavistock	About three quarters per acre, or over average.	About four quarters per acre, badly harvested.	About six quarters per acre	Large crop, of good quality.
Tiverton	One quarter, above an average per acre.	Five bushels per acre, above average	A good average crop	Good crops, much diseased.
Torrington	Considerably above an average, and well harvested.	Early crops well saved, the remainder damaged.	An average, but variable in quality	Quantity and quality good.
Ugborough	Two and a half to four and a half quarters per acre, or over average.	Above average, but much unfit for malt.	Above average, and of excellent quality.	

	Beans.	Peas.	Turnips.	ngolds.
BEDFORD.				
Bedford	About an average, although hardly so.	Where grown a full average	Many very bad, few good, much less than an average.	Some early sown good, but many a total failure.
Biddenham	Under an average	Under an average	Considerably under average	Considerably under average.
Biggleswade	Four quarters per acre		Under an average	Much under average.
Bletsoe	Not so good as last year	Very good crops.	Not above half a crop	Very bad.
Carlton	Under an average	An average	Under average	Under average.
Everton	Not an average	An average	Good crops	Inferior crop.
Harrold	Under an average		Under an average	Nearly a failure.
Keysoe	Under an average	An average	Very much under an average	Not half a crop.
Luton	An average.	An average	Under average	Very bad.
Milton Bryan	Four and a half quarters per acre	Four quarters per acre	Very bad	Very good.
Sandy	A very good crop		Early Swedes diseased, late sown a good average.	Very light crops.
Shefford	About five loads per acre	From seven to eight loads per acre	From ten to twelve tons per acre	Sixteen to twenty tons per acre.
Silsoe	Very good, over an average		Very bad in general, especially the Swedes.	Not so good as usual.
Toddington	An average.	An average	Under average	Under average.
Wilden	One quarter, over an average	An average	Very poor crop	Plant missed, mostly ploughed up.
Woburn	An average, quality good, not very well podded.	Where grown a heavy crop	Very bad crop, but much improved since harvest.	On light soils a crop, heavy land a failure.

The plan as seen in these extracts has great objections. After reading a
returns, who can tell their result? They convey an impression that the
are good, but how much above or below a standard, or a normal, or an av
crop, no one can tell. They are too prolix, although as much condensed a
plan will allow. For the forty counties of England they would require th
two pages of the size of those of this report. For the United States they w
demand a large volume, which would be read by not more than one person
half million of our population. Nor does this plan institute a comparison
the crop of any preceding year. These objections do not obtain to the
adopted in the United States or Prussia.

2. *Prussia.*—This nation has a department of agriculture, presided ov
a secretary. In its operations agricultural societies act as an aid to the de
ment. They meet together and make up an annual report of the crops.
have no knowledge of the means adopted by them to collect the inform
they embody in their report, but the following quotations from their repo
1862 will show the plan adopted. Their estimates, it will be seen, are
parative, and the standard of comparison is one hundred, representing a
aginary normal crop. As no census has ever been taken there of the nu
of bushels produced in any one year, the comparison must always be wit
imaginary standard; nor can their returns be reduced to bushels, as the
here, for want of a basis which such census would furnish. The report is
for "governmental districts," which are nine in number, and the returns
which it is compiled are four hundred and twenty-nine.

The *first* table exhibits the amount of the crops for the province of P
with remarks on the quality, &c.

The *second*, the summary for all the provinces.

The *third*, the average yield for ten years of the provinces.

THE HARVEST IN THE SEVERAL PROVINCES OF PRUSSIA.

1*st Province of Prussia; from* 81 *Reports.*

Governmental districts.	GRAINS.						VEGETABLES.					STRAW.			
	Wheat.	Rye.	Barley.	Oats.	Peas.	Buckwheat.	Potatoes.	Rape.	Sugar beet.	Other kinds of turnip and kale.	Lupine.	Wheat.	Rye.	Barley.	Oats.
1 Kingsberg	0.79	0.92	1.13	1.17	1.14	0.59	0.63	0.87	0.70	0.86	1.01	0.97	0.90	1.14	1.19
2 Gumbinen	0.67	0.94	1.13	1.18	0.91	....	0.53	0.96	1.06	0.93	0.90	0.93	0.96	1.14	1.18
3 Marienwerder	1.02	1.01	1.02	1.02	1.23	0.77	0.97	0.75	0.80	0.72	1.02	1.02	1.04	0.97	0.98
4 Dantzig	0.83	1.01	1.06	1.07	1.21	0.70	0.89	0.79	1.00	0.71	0.94	0.97	1.01	1.04	1.07
Average	0.83	0.97	1.08	1.11	1.12	0.69	0.76	0.84	0.88	0.81	0.97	0.97	0.98	1.07	1.10

Remarks on the crops of the neighborhood of Kingsberg.

Average weight: Of wheat, 82 pounds; of rye, 79 pounds; of barley, 68 pounds; of oats, 52 p
peas, 85 pounds; of buckwheat, 57 pounds; of potatoes, 96 pounds; of rape, 71 pounds per sc
bushel.) Hay of both cuttings, 0.92; first cut of a bad quality in many places; second cut of
quality. Other field crops, 0.98; flax, 1.02; wool crop, 0.99.

Wheat suffered much from rust; turnips from maggots. Potatoes showed the well-known dis
vine, their development being therefore checked in many places, and suffering at the same time from
beans suffered from mildew.

SUMMARY.

Returns of crops in the several provinces.

ince.	GRAINS.						VEGETABLES.					STRAW.					
	Wheat.	Rye.	Barley.	Oats.	Peas.	Buckwheat.	Potatoes.	Rape.	Sugar beet.	Other kinds of turnip and kale.	Lupine.	Wheat.	Rye.	Barley.	Oats.	Peas.	Buckwheat.
.....	0. 83	0. 97	1. 08	1. 00	1. 12	0. 69	0. 76	0. 84	0. 88	0. 81	0. 97	0. 97	0. 98	1. 07	1. 00	1. 19	0. 70
.....	0. 88	0. 89	0. 89	1. 02	1. 00	0. 72	0. 89	0. 69	0. 62	0. 68	1. 06	0. 82	0. 87	0. 85	0. 98	1. 02	0. 70
.....	0. 82	0. 82	1. 01	1. 14	1. 05	0. 39	0. 78	0. 88	0. 81	0. 86	1. 03	0. 80	0. 82	1. 02	1. 14	1. 10	0. 57
.....	0. 90	0. 98	0. 96	1. 00	0. 89	0. 76	1. 02	0. 85	0. 89	0. 82	1. 15	0. 87	0. 93	0. 94	1. 00	0. 98	0. 84
.....	0. 97	0. 97	0. 94	1. 02	0. 93	0. 79	0. 99	0. 70	0. 78	0. 80	1. 06	0. 98	1. 02	0. 93	1. 05	0. 96	0. 83
.....	0. 96	0. 93	0. 95	1. 07	0. 99	0. 90	0. 74	0. 67	0. 92	0. 96	1. 15	0. 92	0. 93	0. 96	1. 08	1. 06	0. 98
.....	0. 87	0. 78	0. 99	1. 13	0. 95	0. 83	0. 76	0. 74	0. 76	0. 82	0. 86	0. 87	0. 86	0. 98	1. 12	0. 97	0. 86
nce	0. 91	0. 73	0. 95	1. 10	1. 03	0. 81	0 71	0. 69	0. 90	0. 89	1. 07	0. 92	0. 83	0. 94	1. 09	1. 02	0. 84
.....	....	0. 83	1. 04	0. 97	0. 97	....	0. 80	0. 95	1. 01	1. 00	....	....	0. 79	0. 95	1. 91	0. 97	....
re.....	0. 89	0. 88	0. 98	1. 05	0. 99	0. 74	0. 83	0. 78	0. 84	0. 85	1. 04	0. 89	0. 89	0. 96	1. 05	1. 03	0. 79

ge yield of the harvest of all provinces during the last ten years.

Year.	Wheat.	Rye.	Barley.	Oats.	Peas.	Potatoes.	Rape.	Sugar beet.	Lupine.
.....	0. 85	0. 84	0. 88	0. 91	0. 70	0. 57	.....	.....	.....
.....	0. 99	0. 98	0. 99	1. 04	0. 92	0. 56	.....	.....	.....
.....	0. 61	0. 66	0. 95	0. 98	0. 67	0. 61	.....	.....	.....
.....	0. 94	1. 00	1. 00	1. 04	1. 05	0. 82	.....	.....	.....
.....	1. 02	1. 01	0. 73	0. 61	0. 44	0. 95	.....	.....	.....
.....	0. 73	0. 83	0. 65	0. 62	0. 37	0. 90	.....	.....	.....
.....	0. 89	0. 77	0. 70	0. 83	0. 72	0. 81	.....	.....	.....
.....	0. 97	0. 99	0. 92	1. 05	0. 89	0. 58	0. 93	0. 95	.....
.....	0. 95	0. 80	0. 93	0. 99	0. 86	0. 66	0. 74	0. 87	0. 78
.....	0. 89	0. 88	0. 98	1. 09	0. 99	0. 83	0. 78	0. 84	1. 04
ıge of 10 years..	0. 88	0. 88	0. 87	0. 92	0. 76	0. 73	.....	.....	.....

ables are named the harvest returns. In Prussia the grain is not ıntil during the winter. In the United States it is mostly threshed ıths of August and September, that the wheat may be hauled to the ›ts at railroads before the roads become bad in winter, and that the ich is stacked in the fields or in the barnyards, may be eaten by luring winter.

il circulars are issued to four hundred and thirty local agricultural which select the most intelligent farmers to answer them. The yield s tested by the threshing, is returned, and these returns are called eshing Returns." They are sent to the local societies, and by the of these returned to the Royal Board of Agriculture, where they are d compared, and the results published. In the published report the bushels of each crop is stated.

ın is an admirable one. It represents the least change in the crop by e hundred to indicate the standard of comparison, for a difference of

[illegible] may be noted. The returns give definite ideas, and are capable
densation that fits them for a territory of the largest extent. The
through which it acts is excellent, and the final examinations and
made by the secretary general of the Royal Board of Agriculture
privy councillor.

3. *United States.*—Before stating the plan pursued in this depart
proper to allude to the causes which called it into existence.

The vast agriculture of the United States, and the remoteness of
of great production from the places of consumption, require several
made between the producer and consumer. The meats and large q
breadstuffs are sold in the months of November and December.

The banks, to meet the great demands upon them for the purchase
products in so short a time, reduce their discounts largely in the fal
the opening of the fall markets is in a greatly lessened amount of
lation. The scarcity of money, the abundance of the crops, with
arranged alarms about the prospect of a European demand, led to a
of prices, which generally was not well got over before the crops
from the control of the producer.

Against this injustice intelligent farmers would remonstrate; but w
their scattered and unconcerted efforts against the influences they e
But with the successful formation of county and State agricultural a
the means of more concerted action were at hand.

The following circular, addressed to other State agricultural soci
president of the Maryland State Agricultural Society, shows the nat
purpose of the first effort to collect, speedily, returns of the annual

"CENTREVILLE, QUEEN ANNE COUNTY, MD., Ju

"DEAR SIR: For the promotion of the farming interest of the country we
procure the earliest reliable information possible of the crops, that the same may
the farmer to guide him in the selection of the best time to dispose of the fruits
This duty should properly be imposed upon an agricultural department of the
ernment; but in the absence of such provision, and in view of the artful prac
lators and others, operating most disastrously through the base venality of the
upon this leading interest, the obligation is devolved upon us.

"The question arises, how shall we best discharge it? Shall we rest content
to do nothing; to sit with our hands before us without an effort to secure th
which by concert of action is entirely within our reach; to see our brother far
twenty to thirty per cent. of the labors of their hands, by the superior informatic
of the astute purchaser, merely from an indisposition on our part to make that
sary to secure the important end we should earnestly labor to accomplish?
but too plain, and pronounces such a course to be altogether unworthy of sens
this charge, then, of inefficiency, of want of energy to secure our own inte
rest upon us; but if we have not already, let us at once so organize the socie
spective States as to make them efficient in procuring this information so all-i
farmers.

"Let us have gentlemen of intelligence and reliable judgment in each county o
States, connected not only by position as officers, but by interest, too, with
ties, that we may have a right to call on statedly for information touching the
different localities. They can be directed to forward their reports to some s
whose duty it should be to collate them and disseminate the information thus d
the public press, and by circulars transmitted to each of the State agricultu
the Union.

"We will invite your attention to the organization of our Maryland Agric
as well adapted to promote the object contemplated, and for your informa
perusal of a circular, which we herewith enclose, and which we had the hono
to our sister societies at the time of its date.

"We hope to be able to lay before you a statement of the wheat, grass, a
Maryland by the 1st of September, and of the corn crop by the 1st or middle o

"Earnestly soliciting your co-operation in this important matter,

"I have the honor to be your obedient servant,

"JAMES T. EAR

"*President of Maryland State Agric*

"To ——— ———,

"*President of* ——— *State Agricultural Society.*"

le, at the same time, issued a circular to individuals and county
sking them to report, by the tenth of October following, the state of
whether above or below an average, and the causes that have bene-
prejudicially affected the crops.

forts assumed a more definite form in the plan adopted by the editor
erican Agriculturist, Orange Judd. In 1862 he issued a circular to
ers and others, containing five sets of inquiries, one for each of the
m May to September, and all alike. The following is a copy of
issued by him; the explanations which were a part of it we omit:

REPORT, JUNE 10, 1862.

State of ——, county of ——, township of ——, by ——, (at ——— P. O.)

	A	WINTER WHEAT.			SPRING WHEAT.		CORN.			RYE.		OATS.		MEADOW.		POTATOES.		FRUIT.		Add any other crop largely grown in your section.	
		B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	Prospects at this date. U	V	W	X
	Weather for one month past, as compared with average for five years past.	Amount of surface sown, as compared with 1861.	Amount of surface sown, as compared with average for five years.	Appearance or prospects at this date.	Amount of surface sown, as compared with 1861.	Amount of surface sown, as compared with average for five years.	Appearance or prospects at this date.	Amount of surface planted, as compared with 1861.	Amount of surface planted, as compared with average for five years.	Appearance or prospects at this date.	Amount of surface sown, as compared with average for five years.	Appearance or prospects at this date.	Amount of surface sown, as compared with average for five years.	Appearance or prospects at this date.	Amount of surface, as compared with average for five years past.	Appearance or prospects at this date.	Amount of surface planted, as compared with average for five years.	Appearance or prospects at this date.	Apples.	Peaches.	Amount growing, as compared with average for five years past.	Prospects at this date.

nitted explanations the number 10 is made to represent an average
d of 100 in the Prussian plan. This is better adapted to the climate
tude of the crops of the United States, for its fraction of *one-tenth*
es sufficiently near to represent the actual production of a county.
ıg tables for each State from the county returns it has been found
to retain fractions of tenths when the number of farm stock or of
grain have to be calculated from the compiled returns in tenths for

details of the plan of Mr. Judd are defective in this—that they ask
ondents to give annual averages for five years, when they have no
ıich to make them. This should be the work of the central agency,
ıld have all the statistics necessary to make the proper deductions.
lefective, too, in asking the same questions for each month. This
t has felt the necessity of asking many questions suggested by the
the preceding month. But we presume that to economize the ex-
›rinting, postage, and labor in compiling the returns, was the cause
he questions for each month alike. To Mr. Judd belongs the credit
lefinite shape to a plan for the annual collection of the statistics of
by which their amount could be approximated to sufficiently near
:tical purposes. His plan is virtually the same as the Prussian, and
ne adopted by this department. The details, however, have been
ged by it, and made applicable to almost every matter belonging to
l production.

neans used in the practical operations of the plan.—It is proper that
ld be noticed, for we believe that before long this plan will be adopted
nercial nations.

nonth during the summer, and bi-monthly during the winter, the
t issued circulars to its correspondents. These are persons recom-
members of Congress and others. The first trial showed that they
give reliable statements as to the number of bushels or pounds of any
ıt very useful information whether the crop inquired about was a
›re greater or less than the preceding crop. Such information, whilst
be implicitly relied upon, is, nevertheless, a most important element
ing the bushels or pounds of a crop.

aber of such correspondents should not exceed *one* for an ordinary
:y of 400 square miles, or twenty miles square, and about five assist-
:y are not paid any compensation, except in copies of the Annual and
:eports and seeds, and they ought to receive a copy of the abridged
›rts, and of the unabridged, so far as relates to agriculture, for the
aiding them in the discharge of their duties.

y named in the circular their returns are sent to the department by
nd as fast as received they are entered on rolls for each State, and
re entered, the returns are added up and the product divided by the
counties returned for each crop. This gives the general average for
in *tenths* and *fractions of a tenth.*

t step is to calculate from these averages the product of a crop in
pounds, because these best exhibit the increase or deficiency. Here-
:ime, lies the chief difficulty of the practical workings of the plan.

t of the census returns showing the product of the *counties*, the cor-
s have nothing upon which to base their estimate of present crops.
epartment been in existence in 1861, and had placed before it the
the counties, it could have made up *county* estimates from year to
1860, based on the estimates for each preceding year and the re-
ıe correspondents for the succeeding one. The publication of these
› aided the correspondents in their judgment. Since 1860 the effect
il war has completely revolutionized agriculture. With these two

difficulties, (the first of which should not have occurred, and the last with the restoration of peace,) the labor of estimating the amount of in bushels and pounds is very great. It involves an examinati general progress of the agriculture of each State for a series of year shown chiefly by the census returns of 1840, 1850, and 1860. The increase must be ascertained of the progress made by each State in at different periods of this progress, also special causes acting on pro railways, or other improvements in transportation, or on prices, a commercial demand, or in change of products by the growth of ma The duration, extent, and intensity of their action must be considere time the points of government supplies must not be overlooked. He section of the country will be influenced by these causes must be from a personal knowledge of the general agricultural condition of t and of much of its local peculiarities. National and State censuse compared, and from every source of information must be derived the correcting the returns of correspondents, who, under the circumstance the country and they themselves are placed, cannot be regarded as c rect. In ordinary times none of these disarranging causes are at hence, when once the plan is fairly in operation, the annually publ mates of the production of *counties* will sufficiently guide the judgm respondents, especially when greater experience shall have familia with their duties. But with all these extraordinary difficulties to conte the returns of correspondents are far more reliable than most of tho township and county assessors, who collect agricultural statistics fo the States. The omissions of these assessors are so many, their and carelessness so great, the reluctance of the people so general t account of their annual products, lest they may be subjected to tax collected returns present most unreliable results.

5. *The utility of these statistics.*—The statistics of the amount o compiled in this manner have had their utility fully tested during year. That year was one of a most extraordinary character. To th causes from civil war were added the injuries to fall crops from fro ampled destructiveness. The corn crop was lessened by them bushels, and when this fact was made known through the monthl the department, an advance of twenty cents a bushel for corn w established. The decrease in the weight and number of hogs was s report for October, which subsequent returns from the packing hou rated, and this statement exerted its legitimate influence on the ma The farmer received an advance that was justly due to him under t of the law of supply and demand. The large advance in the price ducts of the hog is occasioned, not only by the difference in the val and currency, but also by the decrease of hogs since the packing shown in the report of March and April.

Most of the statements made of the amounts of the crops and of th have been tested by time and by commercial transactions, and they sustained in a most gratifying manner. In none of them has ther material error. If, then, the plan of estimating these amounts has stood the test in a time so extraordinary, it cannot fail when, with agricultural industry returns to its accustomed directions, and wi seasons our usual abundant crops are realized.

6. Having stated the objects sought to be accomplished by estim amount of the annual crops and of the farm stock, the plan of m estimates, and the results so far accomplished by it, I proceed to the following tables, the amount of our crops for 1863, as thus asce average yield per acre, the number of acres under cultivation of the average value per bushel or pound, and the average total va crop for the States, individually and collectively.

the information derived from circulars addressed to the correspondents of partment is the chief element of these estimates, a copy of the questions ne of the circulars is here given, that their nature may be seen, and the ter of the information more clearly understood. This table exhibits the) answers for each State.

TABLE No. 1.

Showing the average yield per acre of the crops of 1863, *and the average prices for them in the month of November,* 1863.

STATES.	Average yield of corn per acre in 1863.	Average price of corn per bushel in November.	Average yield of wheat per acre in 1863.	Average price of wheat per bushel in November.	Average yield of rye per acre in 1863.	Average price of rye per bushel in November.	Average yield of oats per acre in 1863.	Average price of oats per bushel in November.	Average yield of barley per acre in 1863.	Average price of barley per bushel in November.	Average yield of buckwheat per acre in 1863.	Average price of buckwheat per bushel in November.	Average yield of potatoes per acre in 1863.	Average price of potatoes per bushel in November.	Average yield of hay, in tons, per acre, in 1863.	Average price of hay per ton in November.	Average yield of tobacco leaf per acre in 1863.	Average price of tobacco leaf per pound in November.	Average yield per acre of flax straw per ton, and seed per bushel, in 1863.		Average price of flax straw per ton, and seed per bushel, in 1863.	
																			Tons.	*Bush.*	*Straw.*	*Seed.*
Maine	34	$1 17	12	$1 76	13	$1 20	26	$0 67	23	$1 08	27	$0 71	126	$0 45	¾	$15 27	.....	.....	.....	.....	.....	.....
New Hampshire	36	1 26	14	1 92	16	1 29	30	62½	23	1 08	20	1 19	121	46	1¼	14 00	.....	.....	.....	.....	.....	.....
Vermont	39	1 16	12	1 58	15	1 17	35	64	27	1 07	24	69	97	50	1	8 59	.....	.....	.....	.....	.....	.....
Massachusetts	35	1 20½	14½	1 94	16	1 28½	26	80	22	1 06½	18½	87	106	68	1½	17 56	1,446	.....	.....	.....	.....	.....
Rhode Island	48	1 17	20	1 50	17	1 20	35	70	23	1 18	.....	.....	95	77	1½	20 00	1,300	$0 25	.....	.....	.....	.....
Connecticut	30	1 20	15½	1 67	14	1 24	31	72	25	1 06	14	93	107	67	1½	15 00	1,500	25	.....	.....	.....	.....
Delaware	25	1 00	18	1 60	10	1 00	20	70	30	1 20	10	1 00	75	80	1	25 00	.....	.....	.....	.....	.....	.....
New York	33	1 01	14	1 39½	15½	1 07½	28	70	21 1-5	1 18	16	73½	85	54	1½	13 28	1,167	20	1½	9	$10 00	$2 33
New Jersey	34½	1 00	18	1 53	15	1 14	23½	73	22½	1 07½	16½	90¼	75½	62	1½	19 00	1,550	18½	1½	10	15 25	2 33
Pennsylvania	33½	94	16	1 42½	13½	1 08	25½	69	22	1 21½	15	84	102	61½	1	19 00	1,277	19½	1½	9	11 00	2 20
Maryland	23	91	11½	1 64½	12	1 08	15	63	.....	.....	21½	89	71	71	1½	22 00	650	9½	1½	10	.....	.....
Kentucky	31	63½	13½	1 02	13	91	23½	65	28	1 25	25	57½	92½	72	1	18 25	975	14½	.....	12	.....	1 25
Ohio	30½	74	13½	1 13	14	89	23½	58½	22½	1 15	11	87	72½	76	1	16 75	757	14 5-9	1	9	8 00	1 83
Michigan	28½	74	13	1 31	13	89	27	55	21½	1 09	10	97	96½	51	1½	11 25	1,067	20½	2	10	12 50	3 00
Indiana	24½	68½	14½	1 06	16	93	24½	58	23	1 25	16	86	62	76	1½	14 50	769	12	1½	8	5 00	1 67
Illinois	21	62½	12 1-5	1 05	16	74½	30	57	22	94½	11	71	70	74	1½	11 50	666	12½	1	8	7 00	1 81
Missouri	32	52	16	1 02	17	64	27½	57	23	98½	14½	72½	103	59	1 3-5	14 00	750	11½	.....	8	.....	1 90
Wisconsin	27	64	14½	92	15½	74½	34½	59	22	96½	10	75½	97½	39½	1½	9 00	1,133	13	1	9	.....	1 94
Minnesota	32½	65½	15	79½	18	69	37	62½	27½	78½	14	84	103	44½	1½	8 00	.....	12	.....	12	.....	.....

TABLE No. 2.—*Crops, &c., for* 1863.

he foregoing table, and the estimated crop of last year, the following compiled.

CALIFORNIA.

es of products.	Total bushels or pounds.	Average yield per acre.	No. of acres to each crop.	Value per bus'l or pound.	Total value of crops.
n, bushels	478,169				
shels	11,664,203				
els	15,505				
hels	1,057,592				
shels	5,293,442				
t, bushels	14,850				
pounds	34,850				
bushels	1,298,474				

CONNECTICUT.

n, bushels	2,059,835	33	62,419	$1 20	$2,471,802
shels	59,901	15	3,993	1 67	100,035
els	618,762	14	44,197	1 24	767,265
els	1,764,329	29	60,839	72	1,270,317
shels	20,813	25	833	1 06	22,062
t, bushels	300,629	14	21,473	93	279,585
pounds	7,500,166	1,250	6,000	25	1,875,041
	562,445	1¼	449,956	15 00	8,436,675
bushels	2,016,462	107	18,845	67	1,351,030
			668,555		16,573,812

DELAWARE.

rn, bushels	3,892,337	25	155,693	$1 00	$3,892,337
ushels	1,217,254	18	67,625	1 60	1,947,606
els	37,412	10	3,741	1 00	37,412
hels	1,570,364	20	78,518	70	1,099,255
ushels	5,105	20	255	1 20	6,126
t, bushels	18,399	10	1,840	1 00	18,399
pounds	15,618	300	52	18	2,811
	36,049	1	36,049	25 00	901,225
bushels	302,345	75	4,031	80	241,876
			343,804		8,147,053

TABLE No. 2—Co

INDIANA.

Names of products.	Total bushels or pounds.	Average yield
Indian corn, bushels	54,602,273	2
Wheat, bushels	20,292,160	1
Rye, bushels	411,343	1
Oats, bushels	5,531,630	2
Barley, bushels	311,191	2
Buckwheat, bushels	183,898	1
Tobacco, pounds	10,416,314	76
Hay, tons	677,677	
Potatoes, bushels	3,485,617	6

ILLINOIS.

Indian corn, bushels	83,013,681	2
Wheat, bushels	31,408,163	1
Rye, bushels	883,190	1
Oats, bushels	19,681,420	2
Barley, bushels	1,205,042	2
Buckwheat, bushels	258,802	1
Tobacco, pounds	20,397,537	66
Hay, tons	1,742,552	
Potatoes, bushels	5,155,523	7

IOWA.

Indian corn, bushels	34,538,276	2
Wheat, bushels	12,649,807	1
Rye, bushels	122,392	1
Oats, bushels	7,761,141	2
Barley, bushels	599,432	2
Buckwheat, bushels	155,914	1
Tobacco, pounds	300,402	74
Hay, tons	594,099	
Potatoes, bushels	2,880,549	9

KANSAS.

Indian corn, bushels	8,518,251	4
Wheat, bushels	262,953	1
Rye, bushels	5,184	2
Oats, bushels	116,270	3
Barley, bushels	5,448	2
Buckwheat, bushels	27,966	2
Tobacco, pounds	26,881	8
Hay, tons	76,218	
Potatoes, bushels	425,952	10

TABLE No. 2—Continued.

MICHIGAN.

f products.	Total bushels or pounds	Average yield per acre.	No. of acres to each crop.	Value per bus'l or pound.	Total value of crops.
ushels	10,633,097	28	379,753	$0 74	$7,868,492
	13,966,153	13	1,074,319	1 31	18,295,660
	494,197	13	38,015	89	439,809
	5,430,797	27	201,141	55	2,986,938
	407,885	21	19,423	1 09	444,595
ushels	630,457	10	63,046	97	611,544
ds	207,061	966	214	20½	42,447
	908,290	1¼	726,632	11 25	10,218,262
ls	4,738,260	96	49,357	51	2,416,513
			2,548,890		33,324,260

MAINE.

ushels	1,855,285	31	59,848	$1 17	$2,170,683
	215,734	12	17,978	1 76	379,692
	165,951	13	12,765	1 20	199,141
	3,364,581	25	134,583	67	2,254,269
	1,002,636	23	43,593	1 08	1,082,847
shels	407,424	22	18,519	58	236,306
ds	7,000			18	1,260
	1,170,859	¾	1,561,145	15 25	17,855,680
ls	6,693,348	113	59,233	45	3,012,007
			1,907,664		27,191,885

MARYLAND.

shels	14,444,922	23	628,040	$0 91	$13,144,879
	7,208,828	11	655,348	1 64	11,822,478
	548,011	12	45,668	1 08	591,852
	4,072,421	15	271,494	63	2,565,625
	19,699	20	985	1 20	23,639
hels	218,405	21	10,400	89	194,380
ls	48,721,415	650	74,956	10	4,872,141
	156,195	1¼	124,956	22 00	3,435,190
ls	1,213,707	71	17,094	71	861,732
			1,828,941		37,511,916

MINNESOTA.

hels	2,756,898	23	119,865	$0 61	$1,681,708
	2,634,975	14	188,213	70	1,844,483
	179,791	18	9,988	60	107,875
	2,053,848	27	76,068	64	1,314,463
	156,412	24	6,517	80	125,130
shels	20,758	13	1,597	83	17,229
ls	43,324	700	62	12	5,199
	329,943	1½	219,962	6 00	1,979,658
ls	2,433,534	103	23,627	44	1,070,755
			645,899		24,343,078

TABLE No. 2—Continued.

MISSOURI.

Names of products.	Total bushels or pounds.	Average yield per acre.	No. of acres to each crop.	Value per bush'l or pound.	
Indian corn, bushels	43,743,295	29	1,508,389	$0 52	$2
Wheat, bushels	2,853,621	16	178,351	1 02	
Rye, bushels	219,947	17	12,938	64	
Oats, bushels	2,128,522	25	85,141	57	
Barley, bushels	171,377	23	7,451	98	
Buckwheat, bushels	95,703	14	6,836	72	
Tobacco, pounds	26,340,505	750	35,121	11½	
Hay, tons	373,756	1½	299,005	14 00	
Potatoes, bushels	1,493,519	103	14,500	59	
			2,147,732		

MASSACHUSETTS.

Indian corn, bushels	2,465,215	33	74,703	$1 20	
Wheat, bushels	129,765	14	9,269	1 94	
Rye, bushels	388,085	16	24,255	1 29	
Oats, bushels	1,327,585	26	51,061	80	
Barley, bushels	151,752	22	6,898	1 04	
Buckwheat, bushels	123,302	19	6,490	87	
Tobacco, pounds	5,200,000	1,200	4,333	26½	
Hay, tons	908,289	1½	681,387	17 58	
Potatoes, bushels	2,881,711	106	27,186	68	
			885,582		

NEW HAMPSHIRE.

Indian corn, bushels	1,835,113	30	61,170	$1 17	
Wheat, bushels	255,163	14	18,226	1 92	
Rye, bushels	145,830	16	9,114	1 29	
Oats, bushels	1,345,829	27	49,846	62	
Barley, bushels	127,159	23	5,529	1 08	
Buckwheat, bushels	98,995	20	4,950	1 19	
Tobacco, pounds	7,000	800	9	25	
Hay, tons	848,417	1	848,417	14 00	
Potatoes, bushels	3,310,163	112	29,555	46	
			1,026,816		

NEW JERSEY.

Indian corn, bushels	11,025,669	34	324,284	$1 00	$
Wheat, bushels	1,808,128	16	113,008	1 53	
Rye, bushels	1,490,497	15	99,966	1 14	
Oats, bushels	4,902,263	24	204,261	73	
Barley, bushels	29,098	22	1,323	1 07	
Buckwheat, bushels	947,577	16	59,224	90	
Tobacco, pounds	194,330	12 00	162	18	
Hay, tons	423,783	1½	282,522	19 00	
Potatoes, bushels	4,693,151	75	62,576	62	
			1,147,326		

TABLE No. 2—Continued.

NEW YORK.

f products.	Total bushels or pounds.	Average yield per acre.	No. of acres to each crop.	Value per bus'l or pound.	Total value of crops.
ushels	24,073,257	33	729,492	$1 00	$24,073,257
	13,021,650	14	930,118	1 39	18,100,094
	5,385,268	14	384,662	1 07	5,762,237
	43,968,916	28	1,570,318	70	30,778,241
s	4,882,778	21	232,513	1 18	5,763,678
ushels	5,378,675	16	336,167	73	3,926,433
ds	10,088,017	1,167	8,644	20	2,017,603
	4,445,982	1¼	3,556,786	13 00	57,797,766
els	29,753,393	84	354,207	50	14,876,696
			8,102,907		163,095,805

OHIO.

ushels	57,433,802	24	2,393,075	$0 74	$42,501,013
s	28,742,963	13	2,210,997	1 13	32,479,548
	863,232	14	61,659	88	759,644
	12,024,028	24	501,001	58	6,973,936
s	1,399,086	22	63,594	1 15	1,608,949
ushels	827,364	11	75,215	87	719,807
ds	28,081,869	757	37,096	14½	4,071,871
	1,347,710	1	1,347,710	16 75	22,574,143
	4,103,005	72	56,986	76	3,118,284
			6,749,333		114,807,195

PENNSYLVANIA.

ushels	30,721,821	33	930,964	$0 94	$28,878,512
s	15,654,255	14	1,118,161	1 42	22,229,042
	6,843,427	13	526,417	1 08	7,390,901
	34,233,936	25	1,369,357	69	23,622,416
s	573,174	22	26,053	1 21	693,541
ushels	5,794,907	15	386,327	83	4,809,773
ds	5,567,774	1,120	4,971	29	1,113,555
	1,571,794	1	1,571,794	19 00	29,864,086
	14,609,335	97	150,612	62	9,057,788
			6,084,676		127,659,612

RHODE ISLAND.

ushels	413,021	35	11,801	$1 17	$483,235
ls	1,413	16	88	1 50	2,119
	33,911	17	1,995	1 20	40,693
	203,192	28	7,257	70	142,234
ls	46,117	23	2,005	1 18	54,418
ushels	3,871	18	215	1 00	3,871
s	1,680	1,150	1½	25	420
	82,725	1¼	66,180	20 00	1,654,500
	435,084	95	4,577	77	335,015
			94,119		2,716,505

TABLE No. 2—Continued.

VERMONT.

Names of products.	Total bushels or pounds.	Average yield per acre.	No. of acres to each crop.	Value per bus'l or pound.
Indian corn, bushels	1,743,522	33	52,834	$1 16
Wheat, bushels	452,683	12	37,724	1 58
Rye, bushels	130,976	15	8,732	1 17
Oats, bushels	3,950,556	30	131,685	64
Barley, bushels	94,102	26	3,619	1 07
Buckwheat, bushels	233,906	24	9,746	61
Tobacco, pounds	40,000	800	50	20
Hay, tons	1,182,785	1	1,182,785	8 59
Potatoes, bushels	3,603,972	97	37,154	50
			1,464,329	

WISCONSIN.

Indian corn, bushels	8,069,642	27	298,876	$0 63
Wheat, bushels	20,842,359	14	1,488,739	92
Rye, bushels	1,012,929	15	67,529	74
Oats, bushels	14,598,236	27	540,675	52
Barley, bushels	950,589	22	43,209	96
Buckwheat, bushels	59,170	10	5,917	76
Tobacco, pounds	153,189	1,033	148	13
Hay, tons	907,162	1¼	604,775	9 00
Potatoes, bushels	4,356,568	97	44,913	39
			3,094,781	

States.	Indian corn.			Wheat.			Rye.		
	Bushels.	No. of acres.	Value of crop.	Bushels.	No. of acres.	Value of crop.	Bushels.	No. of acres.	Value of crop.
California	478,169			11,664,203			15,505		
Connecticut	2,059,835	62,419	$2,471,802	59,901	3,993	$100,035	618,762	44,197	$767,265
Delaware	3,892,337	155,693	3,892,337	1,217,254	67,625	1,947,606	37,412	3,741	37,412
Illinois	83,013,681	3,773,349	51,479,442	31,468,163	2,617,347	32,978,571	883,190	55,199	653,561
Indiana	54,602,273	2,275,095	37,129,545	20,292,160	1,449,440	21,915,533	411,343	25,709	382,549
Iowa	34,538,276	1,279,194	13,815,310	12,649,807	903,558	9,613,853	122,392	6,799	72,211
Kansas	8,518,251	193,597	2,555,475	262,953	16,434	231,399	5,184	259	3,214
Kentucky	52,835,997	1,553,999	33,550,818	5,546,108	426,624	5,657,030	791,447	60,890	720,214
Maine	1,855,285	59,848	2,170,083	215,734	17,978	379,692	165,951	12,765	199,141
Maryland	14,444,922	628,040	13,144,879	7,208,828	655,348	11,822,478	548,011	45,668	591,852
Massachusetts	2,465,215	74,703	2,958,258	129,765	9,269	251,744	388,085	24,255	500,630
Michigan	10,633,097	379,753	7,868,492	13,966,153	1,074,319	18,295,660	494,197	38,015	439,809
Minnesota	2,756,898	119,865	1,681,708	2,634,975	188,213	1,844,483	179,791	9,988	107,875
Missouri	43,743,295	1,508,389	22,746,513	2,853,621	178,351	2,910,693	219,947	12,938	140,766
New Hampshire	1,835,113	61,170	2,146,482	255,163	18,226	489,913	145,830	9,114	189,121
New York	24,073,257	729,492	24,073,257	13,021,650	930,118	18,100,094	5,385,268	384,662	5,762,237
New Jersey	11,025,669	324,284	11,025,669	1,808,128	113,008	2,766,436	1,499,497	99,966	1,709,427
Ohio	57,433,802	2,393,075	42,501,013	28,742,963	2,210,997	32,479,548	863,232	61,659	759,644
Pennsylvania	30,721,821	930,964	28,878,512	15,654,255	1,118,161	22,229,042	6,843,427	526,417	7,390,901
Rhode Island	413,021	11,801	483,235	1,413	88	2,119	33,911	1,995	40,693
Vermont	1,743,522	52,834	2,022,486	452,683	37,724	715,239	130,976	8,732	153,242
Wisconsin	8,069,642	298,876	5,083,874	20,842,359	1,488,739	19,174,970	1,012,929	67,529	749,567
Total	451,153,378	16,866,440	311,669,790	190,888,239	13,525,560	203,906,138	20,796,287	1,500,497	21,371,331

TABLE No. 3—Continued.

STATES.	OATS.			BARLEY.			BUCKWHEAT.		
	Bushels.	No. of acres.	Value of crop.	Bushels.	No. of acres.	Value of crop.	Bushels.	No. of acres.	Value of crop.
California	1,057,592			5,293,442			14,850		
Connecticut	1,764,329	60,839	$1,270,317	20,813	833	$22,062	300,629	21,473	$279,585
Delaware	1,570,364	78,518	1,099,255	5,105	255	6,126	18,399	1,840	18,399
Illinois	19,681,420	820,059	11,021,595	1,205,042	54,775	1,444,791	258,802	23,527	183,749
Indiana	5,531,630	230,485	3,208,345	311,191	13,530	388,989	183,898	11,494	155,152
Iowa	7,761,141	298,505	3,026,845	599,432	24,976	503,523	155,914	9,745	145,000
Kansas	116,270	3,876	44,183	5,448	218	4,685	27,966	1,332	17,619
Kentucky	3,562,772	154,903	2,315,802	302,014	10,786	377,518	14,187	567	8,087
Maine	3,364,581	134,583	2,251,269	1,002,636	43,593	1,082,847	407,424	18,519	236,306
Maryland	4,072,421	271,494	2,565,625	19,639	985	23,639	218,405	10,400	194,380
Massachusetts	1,327,585	51,061	1,062,068	151,752	6,898	157,822	123,302	6,490	107,273
Michigan	5,430,797	201,141	2,986,938	407,885	19,423	444,595	630,457	63,046	611,544
Minnesota	2,053,848	76,068	1,314,463	156,412	6,517	125,130	20,758	1,597	17,229
Missouri	2,128,522	85,141	1,213,258	171,377	7,451	167,950	95,703	6,836	68,906
New Hampshire	1,345,829	49,846	834,414	127,159	5,529	137,392	98,995	4,950	118,804
New York	43,902,916	1,570,318	30,778,241	4,882,778	232,513	5,763,678	5,378,675	336,167	3,926,433
New Jersey	4,902,263	204,261	3,579,052	29,098	1,323	31,135	947,577	59,224	852,819
Ohio	12,024,028	501,001	6,973,936	1,399,066	63,594	1,608,949	827,364	75,215	719,807
Pennsylvania	34,233,936	1,369,357	23,622,416	573,174	26,053	693,541	5,794,907	386,327	4,809,773
Rhode Island	203,192	7,257	142,234	46,117	2,005	54,418	3,871	215	3,871
Vermont	3,950,556	131,685	2,528,356	94,102	3,619	100,689	233,906	9,746	142,683
Wisconsin	14,598,236	540,675	7,591,083	950,589	43,209	912,565	59,170	5,917	44,969
Total	174,770,228	6,841,077	109,432,695	17,751,351	568,085	14,051,983	15,815,159	1,054,627	12,602,388

States.	Tobacco.			Hay.					
	Pounds.	No. of acres.	Value of crop.	Tons.	No. of acres.	Value of crop.	Bushels.	No. of acres.	Value of crop.
California	34,850						1,298,474		
Connecticut	7,500,166	6,000	$1,875,041	562,445	449,956	$8,436,675	2,016,462	18,845	$1,351,030
Delaware	15,618	52	2,811	36,049	36,049	901,225	302,345	4,031	241,876
Illinois	20,397,537	30,627	2,600,686	1,742,552	1,161,707	20,039,348	5,155,523	73,650	3,815,087
Indiana	10,416,314	13,545	1,249,958	677,677	542,142	9,826,316	3,485,617	56,219	2,649,069
Iowa	300,402	403	55,574	594,099	339,485	4,158,693	2,880,549	31,654	1,181,025
Kansas	26,881	30½	5,376	76,218	38,109	381,090	425,952	4,176	200,197
Kentucky	113,912,938	116,833½	16,517,376				1,449,138	15,752	1,043,379
Maine	7,000		1,260	1,170,859	1,561,145	17,855,080	6,693,348	59,233	3,012,007
Maryland	48,271,415	74,956	4,872,141	156,195	124,956	3,435,190	1,213,707	17,094	861,732
Massachusetts	5,200,000	4,333	1,378,000	908,289	681,387	15,967,720	2,881,711	27,186	1,959,563
Michigan	207,061	214	42,447	908,290	726,632	10,218,262	4,738,260	49,357	2,416,513
Minnesota	43,394	62	5,199	329,943	219,962	1,979,658	2,433,534	23,627	1,070,755
Missouri	26,340,505	35,121	3,029,158	373,756	299,005	5,232,584	1,493,519	14,500	881,176
New Hampshire	50,000	62	12,500	848,417	848,417	11,877,838	3,310,163	29,555	1,522,675
New York	10,088,017	8,644	2,017,871	4,445,982	3,556,786	57,797,766	29,753,393	354,207	14,876,696
New Jersey	194,330	162	34,979	423,783	282,522	8,051,877	4,693,151	62,576	2,909,754
Ohio	28,081,869	37,096	4,071,871	1,347,710	1,347,710	22,574,143	4,103,005	56,986	3,118,284
Pennsylvania	5,567,774	4,971	1,113,555	1,571,794	1,571,794	29,864,086	14,609,335	150,612	9,057,788
Rhode Island	1,680	1¼	420	82,725	66,180	1,654,500	435,084	4,577	335,015
Vermont	40,000	50	8,000	1,182,785	1,182,785	10,160,103	3,603,972	37,154	1,801,986
Wisconsin	153,189	148	19,915	907,162	604,775	8,164,458	4,356,568	44,913	1,699,062
Total	276,850,870	333,257	40,913,870	18,346,720	15,641,504	248,677,122	101,712,810	1,145,556	56,004,669

TABLE No. 4.

General summary showing the number of bushels, &c., of each crop, of acres of each, the value of each, and the bushels, acres, and valu and the increase and decrease for the years 1862 *and* 1863, *omittin fornia and Kentucky, for want of returns from the former in* 1863, *a the latter in* 1862.

Names of products.	1862.	1863.	Increase.	Decrease.
Indian corn.....bushels..	533,387,230	397,839,212	.....	135,548,018
Wheat.....do....	177,957,172	173,677,928	.....	4,279,244
Rye.....do....	20,577,971	19,989,335	.....	588,636
Oats.....do....	169,681,113	170,129,864	448,751	Increase..
Barley.....do....	12,385,647	12,158,895	.....	226,752
Buckwheat.....do....	18,763,756	15,786,122	.....	2,977,634
Potatoes.....do....	112,577,482	98,965,198	.....	13,612,284
Total.....	1,045,330,371	888,546,554	.....	157,232,568
Hay.....tons..	21,110,370	18,346,730	.....	2,763,640
Tobacco.....pounds..	136,751,746	163,353,082	26,601,336	.....

Names of products.	1862.	1863.	Increase.
Indian corn.....acres...	14,273,714	15,312,441	1,038,727
Wheat.....do....	11,115,830	13,098,936	1,913,106
Rye.....do....	1,136,160	1,439,607	303,447
Oats.....do....	5,832,538	6,686,174	853,636
Barley.....do....	426,362	557,299	130,937
Buckwheat.....do....	809,777	1,054,060	244,283
Potatoes.....do....	940,069	1,129,804	189,735
Hay.....do....	14,899,902	15,641,504	741,602
Tobacco.....do....	134,588	216,423	81,835
Total.....	49,568,940	55,136,248	5,567,308

Names of products.	1862.	1863.	Increase.
Indian corn.....value...	$187,049,578	$278,118,972	$91,069,394
Wheat.....do....	166,674,311	198,249,108	31,574,797
Rye.....do....	14,403,419	20,651,117	6,247,698
Oats.....do....	62,120,719	107,116,893	44,996,174
Barley.....do....	10,641,359	13,674,465	3,033,106
Buckwheat.....do....	10,611,897	12,654,301	2,042,404
Potatoes.....do....	44,589,141	54,961,290	10,372,149
Hay.....do....	194,399,375	248,677,122	54,277,747
Tobacco.....do....	16,397,696	24,385,744	7,988,048
Total.....	706,887,495	958,489,012	251,601,517

General average showing the yield per acre, and price per bushel, &c crop for all of the loyal States.

Names of products.	Yield per acre in 1862.	Yield per acre in 1863.	Decrease.
Indian corn.....bushels..	37 3-10	25 9-10	11 4-10
Wheat.....do....	16 0-10	13 3-10	2 7-10
Rye.....do....	18 1-10	13 9-10	4 2-10
Oats.....do....	29 0-10	25 4-10	3 6-10
Barley.....do....	29 0-10	21 8-10	7 2-10
Buckwheat.....do....	23 2-10	15 0-10	8 2-10
Potatoes.....do....	119 0-10	99 6-10	19 4-10
Hay.....tons..	1 42-100	1 17-100	25-100
Tobacco.....pounds..	1,019 0-10	754 6-10	264 4-10

TABLE No. 4—Continued.

Names of products.	Price in 1862.	Price in 1863.	Increase.	Per cent. increase.
orn.....bushels..	$0 34 8-10	$0 69 9-10	$0 35 1-10	1.00
.....do....	93 7-10	1 14 0-10	20 3-10	.22
.....do....	70 0-10	1 03 0-10	33 0-10	.47
.....do....	36 6-10	62 3-10	25 7-10	.70
.....do....	86 0-10	1 11 0-10	26 0-10	.30
eat.....do....	56 5-10	80 2-10	23 7-10	.42
.....do....	39 7-10	55 6-10	15 9-10	.40
.....tons..	9 20 0-10	13 50 0-10	4 30 0-10	.47
o.....pounds..	11 9-10	14 9-10	3 0-10	.25

The foregoing table (No. 4) needs some explanation to be properly under-od.

1. *The number of bushels.*—The estimates of these have been made with t care, and they approximate closely to the actual amount of the crops of 2 and 1863.

The number of acres.—This division of the general table has less cor-ess than any other. The correspondents of the department return to it yield per acre of each crop in their respective counties. A correct judgment hat that yield is, if, like all other matters of human knowledge, is one requiring e and study to perfect it. The return giving the yield per acre of the crops 1862 was among the first made to this department by its correspondents. alluding to it in my last report I remarked that, as the correspondents were mong the best farmers, their returns of the yield per acre represent more, haps, those of good farming than of good and bad together." The estimates re undoubtedly too high. As the acreage of a crop is determined by dividing yield per acre into the amount of the whole crop, it is readily seen that the mber of acres will be less as the yield per acre is increased. Hence the ral acreage of 1862 was too low, because the yield per acre was placed too l.

1 1863 the correspondents had attained that knowledge which was essential an approximate correctness, and the returns for that year may be regarded correct. The table of acres, therefore, shows too few acres for 1862, except hay and tobacco, and, as a consequence, the increase in acreage in 1863 is great. This is clearly seen in the increase in wheat. The yield per e in 1862 was 16 bushels; in 1863, $13\frac{3}{10}$ bushels. To one well versed in general average yields the estimate for 1862 will be seen to be much too at.

This fault in the table is incident to the *commencement* of this plan for the lection of statistics, and not to the plan itself, and it has been especially ted out that it may be seen how important it is to sustain a correspondence ere experienced judgments are so essential to obtaining correct information.

3. *The value.*—The values are thus estimated: The correspondents give average prices of each crop in their counties, and from these the general ge of a State is made and multiplied into the amount of a crop. No more rect mode can be adopted by which to estimate the general value of a crop, cept by first estimating the value of the products of each county, but this not be done because no returns of the crops of each county for 1860 have t been published from the Census bureau.

The table included in No. 4 exhibit some striking facts. Although the corn p was less in 1863 by 163,352,132 bushels than in 1862, yet its value was ,840,324 greater. The general average price per bushel in 1862 was thirty-and eight-tenths cents, and in 1863 sixty-nine and nine-tenths cents—an e e of 100 per cent. The wants of the government and the decreased crop

caused a heavy advance in corn in districts where not unfrequently used as a fuel. The scarcity in many sections forced an emigrati into these districts that at once raised the price from almost not that contributed much to raise the general average price of 1863. ence between currency and gold had some influence on prices, but t to table No. 11, in a subsequent part of this report, it will be s general increase in gold value of the month of November, 1863, per cent. over the same month in 1862, the times when the pri ported to the department. Yet the increase of these prices was l

As the wheat crop was nearly the same in both years, and the not greatly less in 1863, the price of wheat will more nearly sho ence in currency and gold values. The crop of 1863 was less 1862 by 4,279,244 bushels, its increased total value 19 per cent., creased price per bushel 22 per cent. Here the relative influence and supply are seen. Similar facts will serve to explain the rem of the tables. It is proper to add that like tables have not he made, either in America or Europe, and that the lesson taught b instructive as the table is novel.

TABLE RELATING TO FARM STOCK.

The presence of civil war caused a cessation of the heavy stock between the west and the south, and following it came an demand for the same from the government. The influence of both tendency to lessen the amount of stock, except in sheep, the dem causing a rapid increase of them. Under such circumstances it b sary to determine the condition of the farm stock, and in Jan were issued for this purpose. The following tables exhibit the circulars, showing those for the several States in tenths and numbers from these returns and those of the census of 1860.

TABLE No. 5.

rns of farm stock in each of the loyal States in January 1864, *he tenths increase and decrease, as returned by correspondents.*

TATES.	Average number of horses as compared with 1861.	Average number of mules as compared with 1861.	Average number of cattle as compared with 1861.	Average number of cows as compared with 1861.	Average number of hogs as compared with Jan., 1863.	Average number of sheep as compared with Jan., 1863.
.....	9	13	9	10	8	13
.....	9	..	9	9	9	13
.....	8	..	10	9	9	11
.....	11	8	10	11	9	13
.....	10	..	11	11	8	10
.....	10	10	10	11	9	11
.....	9	10	10	11	9	12
.....	10	10	10	10	9	12
.....	9	10	10	10	8	12
.....	9	9	9	9	9	12
.....	7	14	7	7	10	11
.....	8	11	8	9	8	12
.....	9	13	10	10	8	12
.....	8	8	9	10	8	13
.....	9	10	10	10	8	14
.....	7	6	7	9	8	10
.....	11	13	12	12	9	13
.....	11	11	13	15	10	20
.....	13	16	13	13	8	17
.....	11	12	14	15	10	15
.....	..	..	11	..	11	..
tory.....	13	15	15	14	13	15

TABLE No. 6.

Table exhibiting the number of the most important farm stock for 1859, *as returned by the census report of* 1860, *and the estimated numbers that were in the several loyal States in January,* 1864, *as estimated from the above returns in tenths.*

States.	HORSES.		MULES.		CATTLE AND OXEN.		COWS.		SHEEP.		HOGS.	
	Year 1859.	Year(Jan.) 1864.	Year 1859.	Year (Jan.) 1864.	Year 1859.	Year (Jan) 1864.	Year 1859.	Year(Jan.) 1864.	Year 1859.	Year(Jan.) 1864.	Year 1859.	Year(Jan.) 1864.
Maine	60,638	56,375	104	124	229,619	211,227	147,315	150,065	452,472	823,498	54,783	46,610
New Hampshire	41,101	38,226	10	10	169,587	151,901	94,880	87,500	310,534	565,271	51,935	42,584
Vermont	67,250	54,790	35	35	192,219	190,119	171,698	167,954	721,993	1,112,969	49,433	38,421
Massachusetts	47,786	52,160	108	119	135,422	136,526	144,499	167,651	114,829	194,190	73,948	63,263
Rhode Island	7,121	7,306	10	12	19,405	20,553	19,700	21,290	32,624	32,624	17,478	14,512
Connecticut	33,276	34,554	82	88	143,028	146,190	98,878	109,714	117,107	179,343	75,120	67,122
Delaware	16,562	17,104	2,294	2,500	35,126	35,358	22,595	23,289	18,857	20,000	47,848	40,248
New York	503,725	463,545	1,553	1,671	849,539	830,184	1,123,634	1,220,200	2,617,855	4,237,324	910,178	823,508
New Jersey	79,707	82,857	6,362	6,816	99,976	101,466	138,818	142,834	135,228	194,728	236,089	219,759
Pennsylvania	437,654	409,594	8,832	10,146	745,946	770,390	673,547	702,211	1,631,540	2,610,458	1,031,266	976,150
Maryland	93,406	87,355	9,829	9,599	153,778	145,986	99,463	101,983	155,765	224,202	387,756	381,788
Kentucky	355,704	272,785	117,635	89,627	566,844	425,443	269,215	191,495	938,900	774,607	2,330,595	1,922,740
Ohio	622,829	589,242	6,917	8,376	963,541	864,206	696,309	690,337	3,063,887	4,779,662	2,175,623	2,320,664
Michigan	154,168	155,970	359	539	333,632	365,445	200,635	220,825	1,467,477	2,465,360	374,664	399,642
Indiana	409,504	385,690	18,627	20,563	678,972	655,870	491,033	505,711	991,175	1,933,790	2,498,528	2,665,096
Illinois	575,161	575,162	38,881	49,257	972,850	1,043,946	532,731	580,343	775,230	1,627,983	2,279,722	2,421,703
Missouri	361,874	272,429	80,941	64,056	823,741	614,355	345,243	303,020	937,445	753,084	2,354,425	1,412,653
Wisconsin	116,192	146,733	1,019	1,535	318,870	431,955	193,996	266,311	332,454	692,803	333,957	400,749
Iowa	174,957	288,678	5,713	12,206	347,708	561,338	188,546	282,819	258,228	1,032,912	921,161	1,581,741
Minnesota	17,122	26,486	395	659	78,622	122,284	40,386	68,495	13,123	42,388	101,252	114,753
Kansas	18,882	24,923	1,430	2,059	61,133	97,812	26,726	49,089	15,702	43,204	128,309	160,386
Nebraska Ter'y	4,522	7,178	473	850	21,500	42,885	7,125	13,162	1,757	5,931	25,965	34,620
					7,941,148	7,965,439	5,726,964	6,066,748	15,104,272	24,346,391	17,060,035	16,148,712

ıbove table of farm stock is compiled from the Census Report for 1860, .e returns made to this department by its correspondents in January, The column for 1859 is taken from the census, that for 1864 has been ted.

plan adopted for taking these statistics could not have been put to a r t than in the formation of this table. In 1861, the usual increase cked by political events, for they broke up that heavy trade in stock, products, which had always existed between the west and the south. The ıs made heavy demands for horses and mules, and greatly increased that tle and hogs. The want of cotton has multiplied in an extraordinary the number of sheep. The presence of war in some of the loyal States, ity of food in others, and the demands of the war, have caused an u movement of stock from one State to another. Hence the usual per ncrease or decrease cannot be relied on as a means of determining mbers for 1864. Had this department been in existence in 1860, and year since then made estimates of the amount of farm stock, more es- y if the census returns of each county had been published, the difficul- w existing would have been in a great measure removed. Still the table n in full confidence of its general correctness.

ill be seen from it that there is a general decrease of stock, except in which have most gratifyingly increased, and a very slight advance in mbers of cattle and cows. This table is instructive, for it points out ection that the industry of the farmer should take.

comparing the census returns of farm stock in 1850 and 1860 it will be ıat horses increased 47 per cent. in that decade. The same rate of in- would have given 18⅘ per cent. for the increase from 1860 to 1864, and te of increase should have been proportionally greater for the loyal . But instead of that rate of increase, which would have added 789,438 horses of these States, there is a decrease of 150,000. There should ıeen, therefore, at least 939,438 horses more than we now have. Such it will require a supply that will not be equal to the demand for years e. A correspondent in Ohio writes that the farmers in his county were g horses and cattle, and directing their attention to mules and sheep. il in our agricultural operations is, that the farmer is governed too much sent demand, and continues in the course it directs too long. The vast tion of American agriculture can soon supply any want when concen- on the commodity needed, and hence over-production will quickly Whilst mules and sheep are much needed, other wants should be re- l, and of these, horses should not be overlooked.

increase of mules from 1850 to 1860 was 102 per cent., and a like in- for the years embraced in the table of stock would be 40⅘ per cent. would make an increase of 123,056, whereas the decrease is 20,762. facts point to the profit that awaits mule-raising.

increase of cattle and oxen from 1850 to 1860 was 32 per cent. The ate of increase would have made that for the four years from 1860 to or the loyal States 13⅗ per cent., equal in number to 1,064,113. Yet crease has been but 24,291.

cows, similar calculations show that the increase from 1850 to 1860 was cent., and for the four years of the table it should have been at least r cent. for these States. This would have given an increase of 824,682, is only 339,784.

progress in sheep husbandry is highly gratifying. The table exhibits crease of 9,242,119 since 1860, and if the increase of this spring is t whole will not be less than 100 per cent., making the present num- l t 30,000,000. The wool clip of this spring could not have been . 75,000,000 pounds. And looking to the high rates of all material

our market of a surplus which would weigh down nom
exports must bear a certain proportion to the imports—
long to buy where it does not sell—they must be consi
tables given show the import and export trade in a ge
exports of the leading articles of farm produce from N
detail, together with their prices, and the price of gold
the foreign demand for wheat as exhibited in the impo
and of our provisions, as seen in the exports of these to a

The internal or home commerce is of the highest
mode of presenting it is by selecting the points where
chiefly centre; and, accordingly, tables of the receipts an
for Chicago and New York are given, with their prices.

TABTE No. 7.

Imports and exports from New York

IMPORTS.

Year	Dry goods	Specie	Other

EXPORTS.

Year.	Domestic produce.	Specie.	Foreign md'se exported.	Total exports.
.....	$95,468,296	$42,191,171	$8,023,994	$145,683,451
.....	131,325,995	4,236,250	7,368,906	142,931,151
.....	149,179,591	59,437,021	7,755,231	216,371,843
.....	164,249,177	49,754,066	6,461,791	220,465,034
6 mos., fr. Jan. 1 to July 1.	84,684,595	29,268,846	5,224,707	119,178,148

TABLE No. 8.

Exports of gold and silver from San Francisco.

ear.	To eastern ports.	To England.	To China.	To Panama.	To other countries.	Total.
.....	$35,719 296	$2,672,936	$3,374,780	$300,819	$258,185	$42,325,916
.....	32,628,011	4,061,779	3,541,279	349,769	95,922	40,666,758
.....	26,194,035	12,950,146	2,666,754	434,508	322,324	42,561,761
.....	10,389,330	28,467,256	4,206,370	2,503,296	505,667	46,071,920
3 mos.	5,607,940	19,835,269	2,911,743	186,245	452,514	28,993,711

Exports of gold and silver from New York and San Francisco.

the supposition that the gold exported from San Francisco to eastern s is exported from New York, by deducting the column representing this rt from the total, and adding to the product the exports of specie from New c, the following table exhibits the amount of foreign exports of specie from e ports:

.....	$48,797,791
.....	12,275,155
.....	75,804,747
.....	85,436,656
.....	52,654,617

*For six months only.

TABLE No. 9.

Amount of exports from New York of the leading articles of agr production.

	1860.	1861.	1862.	1863.	1
Wheat flour, barrels.	1,926,202	3,110,646	2,971,818	2,527,338	
Rye flour.....do...	8,614	11,807	8,397	5,461	
Corn meal.....do...	89,570	108,385	132,606	140,561	
Wheat.....bushels.	13,538,039	28,889,914	25,564,755	15,424,869	
Corn.....do...	3,726,786	12,456,265	12,020,848	7,533,431	
Rye.....do...	450	1,000,405	1,104,549	416,369	
Barley.....do...	8,280	3,927	42,061	52,439	
Oats.....do...	103,076	160,825	210,669	126,536	
Peas.....do...	.....	139,284	113,819	110,911	
Cotton.....bales..	216,880	152,562	24,400	13,94	
Hay.....do...	20,977	15,776	46,674	19,9	
Hops.....do...	32,641	28,337	33,409	25,4	
Leaf tobacco, p'kages.	93,031	116,538	113,575	107,4	
Man. tobacco, pounds.	6,561,160	3,152,484	1,598,044	3,542,9	
Petroleum...gallons.	.....	1,112,476	10,887,701	28,250,7	
Pork.....barrels.	91,640	116,654	181,302	192,9	
Beef.....do...	40,003	29,013	32,997	41,	
Beef.....tierces.	55,328	33,924	51,571	62,	
Cut meats...pounds.	19,447,163	50,565,732	145,102,758	183,519,	
Butter.....do...	10,987,495	23,159,391	30,603,235	23,060	
Cheese.....do...	23,252,712	40,041,225	39,200,439	40,781	
Lard.....do...	18,866,178	47,290,409	126,651,691	120,881	
Tallow.....do...	14,895,969	25,820,335	43,868,920	43,487	

TABLE No. 10.

Prices in New York and England.

	1860.	1861.	1862.	1863.	January 1864.
Wheat flour.....barrel..	$5 30	$5 35	$5 50	$6 05	$7
Wheat flour, best.....do....	.....	7 50	7 50	8 75	11
Rye flour.....do....	3 90	4 00	3 87½	5 45	6
Corn meal.....do....	3 80	3 15	3 00	4 00	5
Wheat, best.....bushel..	1 50	1 45	1 50	1 60	1
Corn.....do....	95	72	64	82	1
Rye.....do....	94	75	83	96	1
Barley.....do....	.....	.....	.....	.....	1
Oats.....do....	47	37	43	71	1
Peas.....do....	.....	.....	.....	.....	1
Cotton.....pound.	11	12½	35½	68½	1
Hay, 100.....do....	.....	90	77½	85	1
Hops.....do....	18	25	20	23	
Leaf tobacco.....do....	4 to 12	4 to 13	8 to 16	13 to 30	12½ to
Petroleum, refined.....gallon..	.....	.....	.....	.....	
Pork, mess.....barrel..	16 25	15 00	12 00	14 50	19
Pork, prime.....do....	11 75	10 50	8 50	12 50	14
Beef, mess.....do....	5 50	6 00	5 50	12 00	14
Hams.....pound..	9	8	6	8	1
Shoulders.....do....	.....	5½	4½	5½	
Lard.....do....	10	10½	8	10	13
Butter, State.....do....	20	18	19	22	29
Butter, Orange county....do....	.....	22	22	25	29
Cheese.....do....	11	10	7	12	15
Tallow.....do....	10	9½	9½	10½	12
Wool, common.....do....	40	30	50	60	75

TABLE No. 11.

THE PRICE OF GOLD.

price of gold was the chief element in advancing the prices of domes-
e, which are given in currency values, the following table is essential
nderstanding of the foregoing price tables:

	1862.	1863.	1864.		1862.	1863.	1864.
.....	112	135	152	July 2.....	119	144	237
.....	115	138	152	9.....	116	131	275
.....	112	146	155	16.....	116	126	253
.....	113	147	158	23.....	119	126	264
.....	113	157	157	30.....	114	127	256
.....	113	157	159	Aug. 6.....	114	127	.....
.....	114	155	159	13.....	114	127	.....
.....	113	163	161	20.....	115	124	.....
.....	112	171	161	27.....	115	124	.....
.....	112	155	162	Sept. 5.....	119	131	.....
.....	111	161	162	12.....	119	129	.....
.....	111	155	162	19.....	117	135	.....
.....	111	139	170	26.....	120	139	.....
.....	112	153	168	Oct. 2.....	123	142	.....
.....	111	147	171	9.....	127	147	.....
.....	111	154	180	16.....	133	153	.....
.....	111	150	179	23.....	132	146	.....
.....	112	150	180	30.....	130	146	.....
.....	112	155	172	Nov. 7.....	131	147	.....
.....	113	150	172	14.....	131	147	.....
.....	113	150	183	21.....	130	153	.....
.....	114	143	186	28.....	129	146	.....
.....	113	146	191	Dec. 4.....	133	152	.....
.....	114	142	199	11.....	132	152	.....
.....	115	144	196	18.....	132	152	.....
.....	118	145	220	25.....	133	152	.....

ENGLISH IMPORTS OF WHEAT.

*' amount for the last ten years, and the countries from which the prin-
upplies were received; capabilities of Russia to successfully compete
e United States.*

ioyancy of our own grain markets is so dependent on those of Great
iat their condition is always an object of interest to the American
We therefore take the following tables from the London Mark Lane
which show the English imports of wheat for the last ten years, and
ries from which are received the principal amounts:

Imports of wheat into Great Britain.

Total imports in quarters.	From United States.	From Prussia.	From Russia.	From Egypt.	From the Canadas.
3,431,227	417,667	672,842	506,839	302,905	18,150
2,607,702	248,966	536,123	.....	457,241	14,570
4,072,833	1,279,150	221,681	759,459	534,603	111,819
3,437,957	650,754	856,311	706,375	204,256	114,795
4,241,719	594,611	625,976	612,217	464,644	100,821
4,060,922	36,906	771,713	385,460	577,190	6,721
5,880,958	1,499,385	1,139 532	1,301,146	197,255	183,422
6,912,815	2,707,744	1,027,733	1,041,461	339,811	549,525
9,469,270	3,724,770	1,450,484	1,327,158	759,036	851,452
5,622,501	2,068,768	1,017,807	1,046,378	535,200	483,230
49,737,904	12,968,574	8,340,202	7,186,493	4,152,230	2,444,565

these tables exhibit our supremacy in supplying the demand of Great
or wheat, it may be well to consider the causes which, in the future,
et that supremacy. The most prominent now is the growth of Russia.

Competition from Russia.—Although the tables show that Prussi Great Britain with a larger amount of wheat than Russia, yet the Pr ports are grown chiefly in Russia, in its Polish provinces. These ar as the best wheat-producing regions in the world, and they lie in th Russia, near to Prussia.

Referring to these imports from Russia, the Mark Lane Express s

"Russia has displayed a great tendency to increase; and probably, if the Rus was in a more tranquil and satisfactory state, socially, financially, and political made would be more rapid. Let the steam-plough once get to work, and the gr southern Russia must pour an immense quantity of cereals upon the European

The "great plains" here alluded to are the Russian *steppes*, or p German writer, who has travelled through them, thus describes the

"What a prospect! The sun's mighty ball had just appeared on the hori steppe extended, endless and immeasurable, in all directions."

And an English writer says:

"The whole of southern Russia, or, as it is more frequently called, New Ru the latest acquisition of the great Czaric empire—must have, once on a time, b lake, whose eastern and western shores rose in the Hindukush mountains and the When this mighty mass of water broke its way out, it left behind a mass of sli decayed organisms, which now forms the celebrated Tchernozon—the inexha earth, which lies upon a mumular limestone at a depth varying from a few inc feet. *It is this land which supplies the greater portion of Europe with cereals wit ficial help.*"

It is here that the steam-plough may be so advantageously intr these vast fertile plains have neither tree, nor bush, nor rock to These plains, however, are subject to greater climatic extremes thai west—to more intense droughts in summer, and more terrible snow-storn

Heretofore Russia has made but little progress in agriculture, f cultural laborers were serfs. Of a population in 1858 of 61,129,4 two and a half millions, or nearly thirty-seven per cent., were se these, 20,150,231 were attached to the land—that is, sold and tran it. There were but 106,897 proprietors of serfs, so that there wer to each one of them. Progress in agriculture might as readily be f the slaves of the south as among a people thus held in bondage. two years ago the present Emperor of Russia abolished serfdom, and to the freed serfs to purchase and hold lands. The progress now Russian towns in the establishment of schools points to the comi in agriculture. And recently he has abolished it in the Polish pro the 15th of April every peasant in them was not only freed, bu owner of all lands, and buildings thereon, which he cultivated.

With these recently awakened motives to agricultural improvem and productive plains of southern Russia and the Polish provinces mence that progress alluded to by the Mark Lane Express, by the of improved common ploughs, harrows, and drills, of the steam reaper, and the thresher; and by the gradual making of railroads, plains there are no obstructions to render them costly. Doubtless many years before this improvement can materially affect our expo to England, for, as stated in the last report, with regard to cotto production alone that gives a nation a foreign market, but its ow consume what that market may have to offer in payment. So United States are superior as a consumer, it can regulate the condi tual trade. But still Russian consumption, too, will increase with it agriculture; and even as it now is, the tables of English imports of how great is the amount of wheat Russia, directly and indirect Great Britain. Political convulsions may retard Russian progress European wars may continue our supremacy, but an expectation of not divert our minds from the development of that market which and most reliable one—the home market

Showing the amount and value of the exports to foreign countries of beef, pork, hams and bacon, lard, butter, [illegible] cheese, [illegible] United States, for the year 1863, *and comparative quantities with* 1862 *and* 1861.

Year.	Great Britain.	Other ports in Europe.	Other foreign ports.	Total and price.	Value.
1863	77,298 tierces of beef	1,253 tierces of beef	199 tierces of beef	78,750, at $26 00 per tierce	$2,047,500 00
1862	63,511 tierces of beef	150 tierces of beef	296 tierces of beef	63,957, at 22 00 per tierce	1,407,054 00
1861	51,421 tierces of beef	145 tierces of beef	522 tierces of beef	52,088, at 18 00 per tierce	937,584 00
1863	5,534 barrels of beef	6,790 barrels of beef	41,929 barrels of beef	54,253, at 14 00 per barrel	759,542 00
1862	1,636 barrels of beef	4,397 barrels of beef	40,331 barrels of beef	46,364, at 12 00 per barrel	556,368 00
1861	5,370 barrels of beef	2,363 barrels of beef	31,807 barrels of beef	39,542, at 11 00 per barrel	434,962 00
1863	2,277 tierces of pork		23 tierces of pork	2,300, at 30 00 per tierce	69,000 00
1862	3,758 tierces of pork	13 tierces of pork	51 tierces of pork	3,822, at 27 00 per tierce	103,194 00
1861	1,582 tierces of pork		55 tierces of pork	1,637, at 16 00 per tierce	26,222 00
1863	37,095 barrels of pork	13,995 barrels of pork	209,003 barrels of pork	260,093, at 19 00 per barrel	4,941,767 00
1862	48,010 barrels of pork	18,816 barrels of pork	183,210 barrels of pork	250,036, at 15 00 per barrel	3,750,540 00
1861	24,276 barrels of pork	1,219 barrels of pork	148,231 barrels of pork	173,726, at 14 00 per barrel	2,432,164 00
1863	176,189,700 pounds of hams and bacon	22,860 200 pounds of hams and bacon	7,859,800 pounds of hams and bacon	206,900,700, at 8 per pound	16,552,056 00
1862	155,462 500 pounds of hams and bacon	15,111,500 pounds of hams and bacon	7,344,500 pounds of hams and bacon	177,918,500, at 8¼ per pound	14,678,276 00
1861	54,382,600 pounds of hams and bacon	858,500 pounds of hams and bacon	6,513,700 pounds of hams and bacon	61,754,800, at 9 per pound	5,557,932 00
1863	55,671,900 pounds of lard	53,814,400 pounds of lard	24,802,900 pounds of lard	134,289,200, at 13 per pound	17,457,596 00
1862	62,325,300 pounds of lard	61,149,500 pounds of lard	27,954,700 pounds of lard	151,429,500, at 10 per pound	15,142,950 00
1861	36,853,200 pounds of lard	10,699,500 pounds of lard	18,891,600 pounds of lard	66,444,400, at 9 per pound	5,979,996 00
1863	21,610,300 pounds of butter	2,675,600 pounds of butter	5,616,800 pounds of butter	29,902,700, at 24 per pound	7,176,648 00
1862	29,241,000 pounds of butter	1,108,600 pounds of butter	5,484,700 pounds of butter	35,834,300, at 17 per pound	6,091,831 00
1861	21,865,200 pounds of butter	1,264,300 pounds of butter	4,808,800 pounds of butter	27,938,300, at 15 per pound	4,190,745 00
1863	39,075,400 pounds of cheese	1,085,400 pounds of cheese	2,946,500 pounds of cheese	43,106,800, at 13 per pound	5,603,884 00
1862	38,722,000 pounds of cheese	1,037,000 pounds of cheese	2,730,900 pounds of cheese	42,489,900, at 11 per pound	4,673,889 00
1861	41,937,900 pounds of cheese	1,557,100 pounds of cheese	1,950,300 pounds of cheese	45,445,300, at 7 per pound	3,181,171 00

RECAPITULATION.

Value in 1863	**$54,607,993**
Value in 1862	**46,404,102**
Value in 1861	**22,740,776**
Value in 1860	**15,336,187**

TABLE No. 13.

Receipts, exports, and prices of produce at New York.

Month.	FLOUR.			WHEAT.	
	Receipts.	Exports.	Price.	Receipts.	Exports.
1863.	*Barrels.*	*Barrels.*	*Best.*	*Bushels.*	*Bushels.*
May	454,333	198,614	$6 10	1,789,952	848,9[illegible]
June	636,501	246,610	4 65	2,853,755	1,779,2[illegible]
July	451,004	260,805	5 26	2,409,184	2,453,0[illegible]
August	298,697	259,189	4 90	1,989,839	1,658,0[illegible]
September	319,923	278,196	5 00	1,132,588	1,665,6[illegible]
October	451,762	233,376	5 95	3,051,968	1,510,2[illegible]
November	530,696	127,263	6 25	3,164,759	516,23
December	429,641	214,530	6 52	1,396,608	1,239,01
1864.					
January	266,240	241,064	6 95	10,244	1,237,13
February	233,822	204,826	6 70	45,283	1,490,42
March	190,785	152,173	6 81	108,407	915,43
April	218,181	155,198	7 55	166,506	508,29
Total	4,480,415	2,571,844		18,119,093	15,842,8[illegible]

Month.	CORN, (MIXED.)			OATS.	
	Receipts.	Exports.	Price.	Receipts.	Exports.
1863.	*Bushels.*	*Bushels.*		*Bushels.*	*Bushels.*
May	1,904,490	949,619	$0 76½	808,338	.....
June	2,262,825	1,605,352	75½	1,442,979	.....
July	3,049,126	1,541,601	68	849,831	.....
August	2,313,899	588,170	69	1,697,223	.....
September	2,196,157	254,751	78	307,035	.....
October	1,205,793	70,072	98	1,319,985	.....
November	295,938	54,150	1 12	2,189,719	.....
December	135,907	25,844	1 26	1,882,344	.....
1864.					
January	145,557	394,754	1 26½	305,690	.....
February	108,751	21,225	1 27½	209,080	.....
March	259,547	43,230	1 32½	258,685	.....
April	120,272	28,004	1 33	238,344	.....
Total	14,028,262	5,576,772		10,969,238	

Month.	BEEF, (MESS.)			PORK, (MESS	
	Receipts.	Exports.	Price.	Receipts.	Export
1863.	*Barrels.*	*Packages.*	*Per bbl.*	*Barrels.*	*Barrel*
May	9,128	5,357	$12 75	119,302	20,7[illegible]
June	2,385	3,432	10 62½	112,343	16,9[illegible]
July	1,285	3,245	11 00	10,155	14,5[illegible]
August	892	3,721	11 87½	6,879	14,6[illegible]
September	718	3,601	11 87½	7,115	16,6[illegible]
October	7,420	5,303	12 25	6,921	12,4[illegible]

TABLE No. 13—Continued.

h.	BEEF, (MESS.)			PORK, (MESS.)		
	Receipts.	Exports.	Price.	Receipts.	Exports.	Price.
.	*Barrels.*	*Packages.*	*Per bbl.*	*Barrels.*	*Barrels.*	*Per bbl.*
.. ....	68,591	12,837	12 75	6,916	17,340	16 25
.....	74,031	27,842	13 06¼	21,864	16,926	17 75
.						
.....	22,988	18,127	13 25	39,364	15,368	19 00
.....	6,558	2,853	13 25	32,144	12,821	20 00
. .....	4,319	16,283	14 06¼	33,687	17,054	22 00
.....	4,654	10,420	15 87½	12,346	14,190	24 75
.....	202,270	113,061		399,036	189,757	

nth.	LARD.			HOGS.	
	Receipts.	Exports.	Price.	Receipts, dressed.	Receipts, live.
863.	*Pounds.*	*Pounds.*		*Number.*	*Number.*
.....	14,996,600	12,439,700	$0 9⅜	.....	39,305
.....	7,596,600	8,690,300	9¾	.....	56,612
.....	1,539,600	6,711,300	9⅜	.....	40,706
.....	378,400	5,215,200	9¾	.....	38,065
....	523,300	6,204,500	10⅛	.....	67,306
.. ..	3,512,800	11,657,400	11⅜	881	112,257
.....	3,599,700	6,877,300	11¼	755	183,359
.....	3,137,500	3,450,900	12	21,208	191,641
.....	2,514,500	14,872,600	13⅛	48,276	29,596
.....	4,324,500	3,709,200	13⅜	59,894	35,073
.....	8,312,200	4,416,400	13⅓	4,400	32,506
.....	9,049,600	8,538,700	13⅜	67	47,963
.....	69,000,900	92,783,500		135,481	874,389

ı.	COTTON.			WHISKEY.		
	Receipts.	Exports.	Price, midl'g.	Receipts.	Exports.	Price.
	Bales.	*Bales.*	*Pounds.*	*Barrels.*	*Barrels.*	
.....	8,193	2,748	$0 55⅜	21,838	.....	$0 44½
.....	16,299	5,532	60¾	26,925	.....	44½
.. ....	13,080	1,112	63½	19,627	.....	45½
.....	11,043	120	66⅛	18,083	.....	45⅝
.....	12,874	454	70½	15,781	.....	51
.. ....	19,332	2,941	86	17,656	.....	59
.. ....	26,902	675	84⅜	20,098	.....	65½
. ....	24,870	210	80⅓	39,594	.....	86½
.....	22,010	461	82½	32,346	.....	91½
.....	28,242	267	81½	34,475	.....	87
.....	39,302	6,200	75⅜	35,575	.....	86
.....	33,538	6,841	77½	22,873	.....	1 13½
.....	265,685	27,561	.....	304,871		

CHICAGO AND NORTHWESTERN AGRICULTURE.

One of the wonders, even in this age, when progress has outstripped the a
ticipations of the most sanguine, is the growth of Chicago. It is not a rep
sentative of manufactures, nor of a foreign commerce, but solely of agricult
and the commerce created by it. Situated at a point of lake navigation wh
makes it the receptacle of an immense and fertile agricultural region, seeking
markets in the eastern States and in Europe through Chicago, the growth
the city has kept pace with the progress of that region, and therefore it is
representative of that progress as well as of its own.

Its more rapid advancement, however, since 1860, is not an indication o
corresponding development of the agricultural resources of the country, wh
trade it has always enjoyed, or of more remote places added to it by new r
road communication, but of that disturbing influence upon commerce caused
the war. The navigation of the Mississippi having been closed in 1861,
products of the upper parts of that river, and beyond it, in Iowa and Misso
as well as the more southern portions of Illinois, had to seek a new transit
the eastern markets. They therefore centred in Chicago instead of in
Louis, and other minor places.

With this explanation we republish the following table of shipments
breadstuffs from Chicago for the last twenty-six years, which we take from
report of the Chicago Board of Trade. How much of successful energy
toil, of increased wealth and of comfort, and of home happiness in the com
life, is embraced in a single glance over these tables!

TABLE No. 14.

Shipments of flour (reduced to wheat) and grain from Chicago for twenty years.

Years.	Wheat.	Corn.	Oats.	Rye.	Barley.	Tota
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bush*
1838	78	.....	.....	.....	.....	
1839	3,678	.....	.....	.....	.....	
1840	10,000	.....	.....	.....	.....	1
1841	40,000	.....	.....	.....	.....	4
1842	586,907	.....	.....	.....	.....	5
1843	688,907	.....	.....	.....	.....	6
1844	923,494	.....	.....	.....	.....	9
1845	1,024,620	.....	.....	.....	.....	1,0
1846	1,599,619	.....	.....	.....	.....	1,5
1847	2,136,994	67,135	38,892	.....	.....	2,2
1848	2,286,000	566,460	65,280	.....	.....	3,0
1849	2,192,809	644,848	26,849	31,453	.....	2,7
1850	1,387,989	262,013	186,054	22,872	.....	1,8
1851	799,380	3,221,317	605,827	19,997	.....	4,4
1852	941,470	2,757,011	2,030,317	127,028	17,315	5,8
1853	1,680,998	2,780,253	1,748,493	120,275	82,162	6,4
1854	2,744,860	6,837,899	3,239,987	148,421	41,153	12,9
1855	7,110,270	7,547,678	1,888,533	92,032	20,132	10,6
1856	9,419,365	11,129,658	1,014,547	19,051	590	21,5
1857	10,783,292	6,814,615	316,778	17,993	.....	18,0
1858	10,909,243	7,493,212	1,498,134	127,008	7,569	20,0
1859	10,759,359	4,217,654	1,174,177	478,162	131,449	16,7
1860	16,054,379	13,743,172	1,039,779	129,156	290,211	31,2
1861	22,913,830	24,186,382	1,665,384	422,492	185,293	49,3
1862	22,902,765	29,451,610	3,112,666	871,796	532,195	56,4
1863	17,925,336	24,444,147	7,574,994	835,133	668,735	50,5

TABLE No. 15.

PORK AND CATTLE TRADE OF CHICAGO.

k trade of Chicago has assumed a magnitude that places this city at f this business. Cincinnati long led all other cities in it, and acquired of Porkopolis, but it must now yield to Chicago. In 1862–'63 packed 608,457 head of hogs, and in 1863–'64 370,623; whilst s will be seen from the following table, packed in 1862–'63 970,264 in 1863–'64 904,659 head.

Pork trade of Chicago.

Years.	Received.	Forwarded.	Years.	Packed.
.....	540,486	192,013	1858–'59	179,684
.....	271,204	110,246	1859–'60	151,339
.....	392,864	227,164	1860–'61	271,805
.....	675,902	289,094	1861–'62	505,691
.....	1,348,890	491,135	1862–'63	970,264
.....	1,677,757	856,485	1863–'64	904,659

Cattle trade of Chicago.

Years.	Received.	Forwarded.	Packed.
.....	140,534	42,638	45,503
.....	111,694	37,584	51,606
.....	177,101	97,474	34,623
.....	204,579	124,146	53,754
.....	209,655	112,745	59,687
.....	300,622	187,068	70,086

TABLE No. 16.

Prices in Chicago.

ate.	WHEAT, BUSHEL.		CORN, BUSHEL.		OATS, BUSHEL.	
	No. 1.	No. 2.	No. 1.	No. 2.	No. 1.	No. 2.
'63.						
.....	.....	.....	.....	.....	33½	.....
.....	.....	.....	.....	.....	54½	52
–'64.						
.....	$1 08	$1 04	76	73½	54	52
.....	1 40 *a* 1 45	1 11	90	84	65½	63½
.....	2 00 *a* 2 05	1 95 *a* 2 00	$1 30	$1 28	84	80

TABLE No. 16—Continued.

Date.	RYE, BUSHEL.		BARLEY, BUSH.		Date.	Wh
	No. 1.	No. 2.	No. 1.	No. 2.		
1862–'63.					1863.	
September 26	$0 40	.....	$0 75	.....	June	
March 26	76	.....	1 37	$1 12	August	
1863–'64.						
September 26	82	$0 80	1 17	1 13	June	
March 26	1 03	1 01	1 35	1 23½	August	
July 1	1 50	1 40	1 40	1 35	.....	.....

Date.	HOGS, 100 LBS.		CATTLE,
	Live.	Dressed.	Li
1862–'63.			
September 26	$2 80 a 3 40	.....	$1
December 26	3 10 a 3 50	$2 80 a 4 10	2
January 30	3 30 a 4 17½	4 10 a 5 00	2
March 26	2 00 a 6 80	.....	2
1863–'64.			
September 26	3 75 a 4 80	.....	1
December 26	4 00 a 6 15	4 50 a 7 00	2
January 30	4 50 a 6 65	6 50 a 7 75	2
March 26	5 75 a 7 75	7 50 a 8 50	2
July 1	8 00 a 9 50	.....	3

Date.	HOG PRODUCT.				
	Mess, bbl.	Prime, bbl.	Lard, lb.	Hams, lb.	Sides, lb.
1863–'64.					
September 26	$13 12 a 13 25	.....	10	.....	.....
December 26	18 00 a 18 50	$14 50 a 15 00	12	9	8
January 30	18 00 a 19 00	16 00 a 16 50	12	10	9
March 26	22 00	20 00 a 20 50	12	11½	9
July 1	39 00 a 40 00	37 00 a 38 00	17	19	....

Date.	BEEF PRODUCT.		Prim
	Mess, bbl.	Beef ham, bbl.	
1863–'64.			
September 26	$11 00 a 12 00	.....	
December 26	10 00	$14 00	
January 30	11 50 a 12 00	17 00	
March 26	14 00 a 14 50	20 50	
July 1	16 00 a 17 00	25 00	

THE PORK-PACKING OF THE WEST.

e Cincinnati Price Current of April 6 contains the full returns of the pork
ed in the west during the past season. The hog product is an interest of
eat magnitude that we give room for the summary statement of these re-

ferring to the progress made in the raising of hogs, as evidenced by the
ber packed, the Price Current says:

revious to 1861 the crop did not vary over four or five hundred thousand hogs, being
imes one or two hundred thousand above, and then the same amounts below *two* mil-
but in 1862 the packing run up to nearly *three* millions; in 1863 to over *four* millions,
his season it has fallen off over *three-quarters* of a million."

ese "rapid and extensive changes" it attributes to the effects of civil war
commerce; to the rapid increase of settlements in the west, especially in
, Illinois, and Missouri. We think there are other causes showing that
ggregate increase in the production of hogs is not as great as here inti-
d—a fact not to be lost sight of in determining the future condition of this
. Why should this great increase have manifested itself in 1862, when the
of pork was so ruinously low in 1861–'62? In these years, when hogs
sold by the farmers, there were no evidences of improvement to encourage
ncreased production of them. The prices of mess pork in New York av-
ed, during the year, as follows: 1859, $16 38 per barrel; 1860, $17 98;
, $15 89; 1862, $12 28; and 1863, $14 40. The price during 1860
very encouraging, and as the increase of horses and cattle had tended to
production the direction of stock increase turned to hogs. Hence a large
ase was made in 1860 and 1861. In the fall of the last of these years stock
in September were worth, in the west, about *one-third* what they were in
ember, 1860. This was the result of the war chiefly, and partly from too
an increase. Many hogs were held over, which swelled the number in
. And *those packed* were increased by the fact that the heavy trade in
ogs to the south from Kentucky, into which State they were taken from
ern States, was entirely stopped by the war. These causes greatly in-
ed the ratio of the number packed over that of production in 1862 and
, when compared with that of former years. The falling off, therefore, in
ast season was not due to the want of corn alone, as intimated by the Price
ent, when it says:

Were it not for the bad failure of the corn crop last year, consequent upon the cold, un-
l summer, and the killing frost of July and August, there can be no doubt the pork
the past season would have *exceeded that of any previous season by half a million of hogs.*"

n the contrary, we think that with ordinary good crops of corn, there would
been a *falling off*. The returns of the correspondents of this department ex-
the fact that the number in January last was 911,323 less than in 1859
loyal States. The number of fatted hogs last fall and winter *brought to*
cking houses was not much diminished by the want of corn, *as now ap-*
, for these returns of our correspondents indicate that no great number of
have been kept over. The Price Current very correctly remarks that
mers, owing to the high price of corn, sold off all the hogs they had which
in a condition fit to be disposed of, and the high prices tempted them to
even those they intended for home use, to a very great extent, supposing
they would be able to buy the cured pork cheaper afterward, no doubt."
is essential to understand the causes of the decrease of last season, and,
een here, they show that under the most favorable conditions of the corn
, hogs will be very scarce next season. Should peace return, and the
hern demand for live and packed hogs be resumed next year, or the year
wing, there will be no more profitable stock than hogs.
The following are the tables from the Price Current:

Summary of hogs packed in the west.

States.	1862–'63.	186
Ohio	991,183	
Iowa	404,861	
Indiana	585,428	
Illinois	1,472,834	1,
Kentucky	130,920	
Wisconsin	201,745	
Missouri	297,611	
	4,084,582	
Decrease	793,477	

But this decrease does not show the entire decrease in the hog crop west. The shipments to the east must be taken into consideration also returns of these are yet imperfect. We have not yet got, says the Pri rent, the shipments through Canada, nor by the way of Buffalo, but t the way of Pittsburg and Dunkirk compare as follows, from Nove February 1, each season:

	1862–'63.	
New York and Erie	136,007	
Pennsylvania Central	171,496	
	307,503	

Here is a falling off of 209,181, and added to the decreased number make the total decrease 997,658. The decrease in the average we yield of lard is as follows:

States.	Average weight per hog.		Yield of lard p	
	1862–'63.	1863–'64.	1862–'63.	
	lbs.	lbs.	lbs.	
Ohio	223¼	196⅝	27	
Indiana	209	182⅛	27	
Illinois	217¼	189⅛	28	
Kentucky	204	182	31	
Missouri	220	188⅛	29	
Iowa	209¼	188⅛	26¼	
Wisconsin	224	202	33¼	

The Price Current says: "We find that the average weight for t packing is 188$\frac{6}{29}$ pounds, and the average yield of lard, per hog, 22 The decrease in the average weight is about 26 pounds per hog, as with last season, in round numbers; but the accurate per cent. of de find as follows:

The aggregate weights of similar numbers of hogs, this season and last, ed at points from whence the averages were furnished, compare as follows:

62–'63, pounds	782,601,236
63–'64, pounds	684,775,632
"Decrease	97,825,604

This is equal to about 12½ per cent., which, added to the decrease in the ber packed in the west, is as follows:

cent. of decrease in number	19½
cent. of decrease in weight	12½
	31 7/10"

to the decrease in the number packed in the west we add that of the num- nipped by Pittsburg and Dunkirk, the entire decrease in number would be 22 8/10 per cent.

e percentage decrease of *lard* is as follows:

-'63, pounds	118,016,080
-'64, pounds	72,874,468
Decrease in weight	45,141,612

ng a fraction over 38 per cent. The head and gut lard is not included in stimate. This was about 8 pounds per hog this season, and 12 pounds The decrease, then, is as follows:

mber, per cent	22 8/10
ight, per cent	12½
d, per cent	38

nay be proper to add that the above table of the number packed does not ate the number raised in a State. Indiana is the greatest hog-growing , Illinois second, Ohio third, Kentucky fourth, Iowa fifth, and Missouri at this time. In 1859 Indiana was the first, Missouri second, Kentucky Illinois fourth, Ohio fifth, and Pennsylvania *sixth*.

PRICE OF HOGS AT CINCINNATI.

e following table shows the *average* price per 100 pounds of hogs at Cin- ti for the last ten years:

55	$4 45½	1859–'60	$6 21½
56	6 04½	1860–'61	5 97
57	6 23½	1861–'62	3 28½
58	5 16½	1862–'63	4 45
59	6 58½	1863–'64	7 00½

METEOROLOGY OF 1863.

FROM THE SMITHSONIAN INSTITUTION.

THE publication of meteorological tables in the monthly and b reports of the Department of Agriculture having excited considerabl and gratified a useful curiosity in the minds of many farmers and othe men, we are induced to complete tables for the entire year 1863, an them in this more permanent form for future and more general refer their aid any one may ascertain the precise average amount of rain and tenths, or the mean degree of heat and cold, for any month of sev years in the section or State where he resides, and compare the sam fall of rain or mean temperature of surrounding sections for the san and years. Thus, if disposed to emigrate to some other section or the aid of these tables he may select for examination such regions as pare with his present location in climate and general characteristics o or, should the interests, health, or comfort of his family suffer whe resides, by long periods of severe heat or cold, or by droughts, or by snows or heavy rains, at particular seasons, these tables will aid hin ing a residence more desirable in temperature or in its amounts of su at those seasons.

Other uses of these tables will be suggested as the inquiring min them on these familiar topics, and their continuation in the bi-mont on the crops, and republication in annual reports of the Departmen culture, will expand the field for observation and comparison as th are thus increased and extended.

With these brief reasons for publishing these tables, we will direc familiar with them in the reports on crops.

HOW TO USE THEM.

There are two tables for each month—one of the current weather of in 1863 at each place named; the other of averages and means of t and rain for the same month in several years in the States and named.

The first table for each month exhibits the greatest heat and cold, and lowest range of the thermometer, with the dates prefixed when it the mean temperature of the month, and the amount of rain, (or snow as melted,) in inches and tenths, falling in said month at the places given by each observer. Daily observations were made at the hour and 2 and 9 p. m., and the rain and melted snow measured carefully

The second table for each month shows the average mean tempe average depth of rain and melted snow, in each State and Territory the years 1855, 1856, 1857, 1858, and 1859; also for these five ye tively, and for the year 1863. The first column of this table gives t number of places in each State and Territory in which the observa made that have been used by us in calculating the averages and me table.

We may further remark that blanks in the tables signify that n tions were reported. Cyphers (0) denote the zero of Fahrenheit's th or that no rain or snow fell, and a dash (—) signifies that the num degrees following it was below zero.

I. JANUARY, 1863—CURRENT WEATHER.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain or melted snow.
				°		°	°	In.
.....	Washington	Wm. D. Dana	*16	55	9	—4	26.0	6.71
.....	Penobscot	B. F. Wilbur	5	54	9	—2	24.5	4.75
.....	Waldo	Geo. E. Brackett....	16	50	9	—5	23.7	4.40
.....	Kennebec	R. H. Gardiner	16	48	9	—4	25.6	4.42
.....	Androscoggin....	Asa P. Moore.....	26, 30, 31	43	9	—6	25.4	4.98
HIRE.								
.....	Coos	Branch Brown.....	4	48	18	—18	22.0	4.06
.....	Belknap.....	Charles H. Pitman..	3	56	8	4	30.2	2.00
.....	Sullivan.....	Arthur Chase.....	5	46	18	—2	27.0	3.67
T.								
.....	Essex	H. A. Cutting	15, 16	46	18	—15	23.1	5.60
.....	Orleans	James A. Paddock..	3	50	18	—13	22.4	4.35
.....	Washington	Dr. M. M. Marsh....	6	49	18	—12	23.9	.....
.....	Chittenden	Rev McK. Petty ...	4	51	18	—15	23.9	3.47
.....	Rutland	David Buckland....	4	57	18	—6	26.9	4.76
ETTS.								
1.....	Bristol	Samuel Rodman....	3, 16	52	8, 18	10	35.5	2.63
.....	Worcester	J. G. Metcalf	16	52	18	6	30.9	3.90
.....	Hampshire	Prof. E. S. Snell....	16	52	18	5	29.1	5.05
.....	Hampden.....	Rev. E. Davis.....	16	49	8, 18	5	27.8	5.87
.....	Berkshire	Wm. Bacon	15	58	18	2	29.3	9.25
LAND.								
.....	Providence	H. C. Sheldon	16	54	18	9	33.2	3.57
.....	....do	Prof. A. Caswell....	16	54	18	8	32.2	3.61
ICUT.								
.....	Windham	Rev. D. Hunt.....	16	56	18	5	29.1	4.44
.....	Tolland	Wm. H. Yeomans...	5	70	18	10	34.3	.....
.....	Middlesex	Prof. Jno. Johnston.	16	57	4	6	30.8	4.64
.....	New Haven	D. C. Leavenworth.	16	53	7, 18	11	31.2	.....
.....	Litchfield.....	D. W. Learned	16	53	8, 18	4	28.7	4.56
RK.								
ıb Ins't.	New York.....	Prof. O. W. Morris..	16	56	18	15	37.2	5.55
ding....	Dutchess	Wm. H. Denning...	16	56	18	9	31.4	5.30
s	Westchester.....	O. R. Willis	16	55	18	11	33.6	.....
.....	St. Lawrence....	C. H. Russell	3	56	18	—18	26.0	3.03
.....	Oneida.....	Dr. H. M. Paine	4	59	18	3	31.9	5.49
.....	Madison.....	Dr. S. Spooner	4	54	18	—5	29.1	3.48
.....	Jefferson	S. O. Gregory	3	53	18	—17	24.9	2.89

I. JANUARY, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.
NEW YORK—Cont'd.				°		°	°
Oswego	Oswego	Wm. S. Malcolm	4	54	18	3	33.3
Skaneateles	Onondaga	W. M. Beauchamp	4	53	18	4	30.7
Auburn	Cayuga	John B. Dill	4	52	18	5	29.4
Nichols	Tioga	Robert Howell	5, 25	50	2	—2	29.4
Rochester	Monroe	Dr. M. M. Mathews	3	55	17	—2	30.5
Wilson	Niagara	Dr. E. S. Holmes	4	57	17, 18	8	31.7
NEW JERSEY.							
Newark	Essex	W. A. Whitehead	16	58	18	11	33.0
Mount Holly	Burlington	Dr. M. J. Rhees	4	59	18	16	37.2
PENNSYLVANIA.							
North Whitehall	Lehigh	Edward Kohler	16	51	3	5	32.0
Philadelphia	Philadelphia	J. A. Kirkpatrick, A M	15	61	18	15	37.2
West Haverford	Delaware	Dr. Paul Swift	15	63	18	12	36.5
Fallsington	Bucks	Eben'r Hance	15	63	18	13	36.3
Mount Joy	Lancaster	J. R. Hoffer	27	55	18	12	33.3
Harrisburg	Dauphin	Dr. John Heisely	16	51	18, 19	18	34.9
Gettysburg	Adams	M. and H. E. Jacobs	5	54	18	6	32.5
Fleming	Center	Samuel Brugger	25	54	2	0	29.3
Blairsville	Indiana	W. R. Boyas	4	41	17	5	25.0
Altoona	Blair	Thos. H. Savery	5	51	18	2	30.3
Connellsville	Fayette	John Taylor	26	58	18	3	32.0
Canonsburg	Washington	Rev. W. Smith, D.D.	3	55	18	4	31.9
MARYLAND.							
Chestertown	Kent	Prof. J. R. Dutton	15	63	18	17	38.
St. Mary's	St. Mary's	Rev. J. Stephenson	15	63	18	20	40.
Sykesville	Carroll	Miss H. M. Baer	15	61	18	8	32.
DIST. OF COLUMBIA.							
Washington	Washington	Smithsonian Inst'n	25	64	2	8	
TENNESSEE.							
Clarksville	Montgomery	Wm. M. Stewart	12, 13	67	16	15	
KENTUCKY.							
Louisville	Jefferson	Mrs. L. Young	13	65	18	9	38.
OHIO.							
Austinburg	Ashtabula	Dole & Griffing	14	49	18	—4	30.
East Fairfield	Columbiana	S. B. McMillan	14	49	1	1	31.
New Lisbon	....do	J. F. Benner	14	52	1	—3	31.
Welshfield	Geauga	B. F. Abell, A. M	14	51	18	5	31.

I. JANUARY, 1863—CURRENT WEATHER—Continued.

...a.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain or melted snow.
Continued.				°		°	°	In.
lle.....	Guernsey.....	Rev. D. Thompson..	13, 14, 24	50	1, 19	10	31.8	7.61
l	Cuyahoga	Mr. & Mrs. G. A. Hyde	14	55	18	7	34.1	3.87
sland.....	Erie	Geo. C. Huntington.	5, 14	47	17	11	32.4	3.04
.....	Huron.....	Rev. A. Newton....	13, 14	54	18	4	33.0	6.07
.....	Licking	Israel Dillo	3	56	18	—5	33.3	4.00
.....	Franklin	Prof. Jno. Haywood.	13	58	18	—3	33.8	7.12
.....	Lucas	Dr. J. B. Trembley .	4	54	18	9	34.1	3.88
reen.....	Wood	Dr. W. R. Peck	13	55	16	10	35.8	3.29
.....	Champaign	Pf. M. G. Williams..	13	56	1	1	32.7	6.36
.....	Clermont	George W. Crane...	4	53	18	6	33.7	7.00
.....	Hamilton	R. C. Phillips.....	12, 13	60	17, 18	10	38.7	6.28
l.....	....do	Geo. W. Harper	20	58	17	11	36.5	5.55
IGAN.								
.....	Monroe.....	Miss F. E. Whelpley.	4, 5	50	16	3	32.0	2.51
.....	Washtenaw.....	C. S. Woodard.....	4	51	16	—1	25.8	1.26
City	Leelenaw	"Herald".....	3	50	16	7	30.0	.....
.....	Ottawa.....	L. H. Streng.....	13	51	16	8	70.6	3.75
.....	Keweenaw	Wm. Van Orden, jr..	16	42	9	—8	24.9	.....
.....	Marquette	F. M. Bacon.....	3	44	17	2	18.9	1.96
IANA.								
l.....	Wayne.....	Edward B. Rambo..	13	56	17	0	33.9	5.75
.....	Henry	Wm. Dawson.....	13	55	18	7	32.2	.....
nd.....	St. Joseph.....	James H. Dayton...	13	56	17	8	32.8	3.21
.....	Park	Misses F. and M. Anderson	13	57	7, 16, 17	10	31.5	3.50
rt.....	Cass	Isaac Bartlett.....	13	56	7	9	33.6	5.55
nony.....	Posey	Jno. Chappellsmith .	12	64	17	13	38.9	4.85
NOIS.								
.....	Cook	Samuel Brooks.....	3	56	16	—4	27.9	.....
.....	McHenry.....	E. Babcock.....	3	53	7	—2	28.2	2.65
.....	De Kalb.....	N. E. Ballou, M. D..	3	60	6, 7	7	31.7	4.45
.....	La Salle.....	Miss E. H. Merwin..	3	60	6	8	31.6	3.51
go.....	Winnebago.....	Jas. W. Tolman	31	58	7	—6	28.0	2.86
.....	Tazewell	J. H. Riblett.....	3	57	6, 16	6	31.0	3.25
.....	Peoria	Frederick Brendel ..	3	58	6, 16	10	33.7	2.83
.....	Morgan	Timothy Dudley....	3	62	16	6	34.2	2.57
.....	Madison	Ad. F. Bandelier	3	59	16	12	35.3	3.93
.....	Knox.....	Prof. W. Livingston.	3, 13	54	6	6	29.4	2.65
er	Scott	J. and Miss E. Grant.	3	61	17	7	34.3	2.89
.....	Hancock.....	S. B. Mead, M. D....	13	60	6, 7, 15	9	31.7	2.80
ONSIN.								
e.....	Manitowoc	Jacob Lüps.....	3	48	9	2	29.2	2.84
.....	Milwaukie.....	Carl Winkler	2	47	6	8	29.5	3.88

I. JANUARY, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
WISCONSIN—Cont'd.				°		°
Weyauwega	Waupacca	Wm. Woods	3	50	17	—5
Rocky River	Columbia	W. W. Curtis	3	49	7	1
Beloit	Rock	Henry S. Kelsey	3	56	7	—4
Madison	Dane	Prof. J. W. Sterling	3	48	7, 16	4
Odanah	Ashland	Edwin Ellis	2	34	8	—14
Superior	Douglas	Wm. Mann	1	44	16	—32
MINNESOTA.						
Beaver Bay	Lake	C. Wieland	3	39	16	—27
Itasca	Anoka	O. H. Kelly	2	50	16	—14
St. Paul	Ramsey	Rev. A. B. Paterson	1, 2	40	16	—14
Forest City	Meeker	Henry L. Smith	1, 2	46	16	—30
IOWA.						
Lyons	Clinton	Dr. P. J. Farnsworth	3	54	6, 7	5
Dubuque	Dubuque	Dr. Asa Horr	13	51	6, 7, 16	4
Independence	Buchanan	A. C. Wheaton	13	54	16	0
Iowa City	Johnson	Theo. S. Parvin, A.M.	13	59	16	0
Fort Madison	Lee	Daniel McCready	13	58	16	7
Waterloo	Black Hawk	L. H. Doyle	13	53	16	—7
Algona	Kossuth	Dr. & Miss L. McCoy	2, 3	46	16	—13
Pleasant Plain	Jefferson	T. M'Connel	13	62	16	4
MISSOURI.						
St. Louis	St. Louis	Dr. Geo. Engelman	12	65	17	12
Athens	Clark	J. T. Caldwell	26	90	22	40
Canton	Lewis	George P. Ray	13	63	15	7
KANSAS.						
Lawrence	Douglas	A. N. Fuller	13	63	27	16
Manhattan	Riley	J. T. Goodnow	11	69	16	—4
Fort Riley	Davis	Dr. F. I. Drew	11	68	16	—2
NEBRASKA TER.						
Elkhorn City	Washington	Mrs A. M. J. Bowen	2	51	16	—9
Bellevue	Sarpy	Rev. Wm. Hamilton	4	59	16	—6
DAKOTA TER.						
Yankton	Yankton	H. G. Williams	4	49	15	—15
WASHINGTON TER.						
Neeah Bay	Clallam	James G. Swan	14	56	24	37
CALIFORNIA.						
Silver Creek	Plumas	M. D. Smith	5, 9, 31	52	30	3
Marysville	Yuba	W. C. Butler	30	62	17	33
Sacramento	Sacramento	Dr. Thos. M. Logan	6	58	22	34
San Francisco	San Francisco	Dr. W. O. Ayres	8	61	14, 18, 27	40

II. JANUARY—AVERAGES.

rritories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years.		Averages. 1863.	
		Mean temp.	Mean rain.	Mean. temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*
.....	5	24.3	4.83	12.6	2.46	11.9	7.81	22.6	3.81	17.7	4.81	17.8	4.74	25.0	5.05
ire	4	25.8	5.65	15.8	2.95	10.4	3.34	25.1	2.46	16.1	3.82	18.6	3.64	26.4	3.24
.....	4	25.3	1.95	11.4	1.48	8.2	2.57	22.7	1.88	18.1	2.63	17.1	2.10	24.0	4.45
s.....	12	29.1	4.88	18.0	3.24	16.0	5.06	31.2	3.20	26.0	7.04	24.1	4.68	30.5	5.34
.....	1	30.0	6.45	18.6	5.25	16.3	5.50	33.1	3.33	29.3	5.75	25.5	5.26	32.7	3.59
.....	4	29.6	5.40	20.3	4.61	15.8	4.32	32.4	3.03	25.8	7.53	24.8	4.98	30.8	4.41
.....	19	27.7	3.36	16.9	2.82	13.9	3.04	31.0	2.25	26.4	3.52	23.2	3.00	30.6	3.95
.....	5	32.4	3.37	20.6	3.67	19.6	4.43	37.2	3.58	31.7	5.47	28.3	4.10	35.1	4.27
.....	19	30.0	2.72	18.6	2.54	18.4	2.69	36.3	2.15	30.5	3.52	26.8	2.72	32.5	4.37
.....	1	.....	....	21.1	....	20.2	....	40.7	1.18	.....	4.84	27.0	2.51	37.2	3.98
.....	5	33.8	3.28	21.9	3.59	21.9	2.88	38.6	1.67	34.2	4.69	30.1	3.22	37.2	3.98
olumbia..	1	35.1	....	21.6	4.00	21.8	0.89	40.2	1.62	36.3	4.54	31.0	2.76	41.7	2.68
ia.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....
.....	2	39.6	3.64	25.6	1.38	26.9	2.16	45.8	4.56	39.6	3.31	35.5	3.01	40.9	8.58
.....	4	38.7	3.32	20.9	1.80	24.7	1.53	42.1	2.66	34.0	3.05	32.1	2.47	38.9	7.33
.....	19	31.4	2.73	17.4	1.69	16.8	1.39	37.3	1.72	30.5	2.42	26.7	1.99	33.4	5.60
.....	7	25.8	3.50	13.3	1,24	11.3	2.70	31.7	4.01	25.5	2.70	21.5	2.83	33.7	2.39
.....	4	33.6	4.66	21.5	0.80	16.9	1.01	38.5	2.64	31.8	2.29	28.5	2.28	33.8	4.57
.....	12	28.2	9.24	14.4	0.96	11.7	0.72	34.5	1.82	26.2	1.78	23.0	2.90	31.4	3.13
.....	9	21.2	2.60	9.7	8.56	6.9	1.12	29.7	2.07	19.7	1.21	17.4	3.11	25.1	2.72
.....	3	0.8	....	0.9	2.35	6.0	0.91	20.9	2.51	11.1	0.98	7.9	1.69	19.3	1.18
.....	7	23.5	2.08	9.3	1.04	5.7	0.77	32.0	2.03	22.9	1.05	18.7	1.39	27.5	2.57
.....	2	33.8	4.66	20.1	1.03	19.3	0.41	39.6	2.85	33.4	2.32	29.2	2.25	42.9	3.88
.....	2	.....	....	.....	....	.....	....	37.7	1.79	30.8	1.43	34.2	1.61	36.2	0.57
rritory ...	1	.....	....	.....	....	.....	....	32.9	1.82	22.4	0.94	27.6	1.38	29.8	0.75
.....	2	44.4	2.67	65.2	4.57	50.1	1.49	46.7	2.50	45.6	1.41	50.4	2.53	44.2	3.54

I. FEBRUARY, 1863—CURRENT WEATHER.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
MAINE.				°		°
Perry	Washington	Wm. D. Dana	20	43	4	—17
Dexter	Penobscot	B. F. Wilbur	20	41	4, 5	—14
Belfast	Waldo	George E. Brackett	20, 26	40	4	—23
Gardiner	Kennebec	R. H. Gardiner	20	44	5	—23
Lisbon	Androscoggin	Asa P. Moore	20	42	5	—23
Cornishville	York	G. W. Guptill	27	44	4	—16
NEW HAMPSHIRE.						
Exeter Centre	Rockingham	Elias Nason	20	50	5	—15
Stratford	Coos	Branch Brown	15	40	4	—32
Barnstead	Belknap	Charles H. Pitman	27	40	4, 5	—20
London Ridge	Merrimack	Dr. Isaac S. French	25, 27	62	4	—12
Claremont	Sullivan	Arthur Chase	15	46	5	—23
VERMONT.						
Lunenburg	Essex	H. A. Cutting	6, 27	40	4	—32
Craftsbury	Orleans	James A. Paddock	15	42	4	—28
Brookfield	Orange	T. F. Pollard	15	42	4	—33
Montpelier	Washington	Dr. M. M. Marsh	15	45	5	—25
Cala's	do	Jas. K. Tobey	15	40	4	—32
Burlington	Chittenden	Rev. McK. Petty	19, 27	40	4	—29
Brandon	Rutland	David Buckland	15	46	4	—22
MASSACHUSETTS.						
New Bedford	Bristol	Samuel Rodman	10	51	4	—4
Worcester	Worcester	H. C. Prentiss	27	53	4	—6
Milton	do	John G. Metcalf	27	50	4	—8
Amherst	Hampshire	Prof. E. S. Snell	27	45	5	—9
Westfield	Hampden	Rev. E. Davis	27	48	5	—10
Richmond	Berkshire	Wm. Bacon	6	48	4	—14
RHODE ISLAND.						
Providence	Providence	Prof. A. Caswell	19	50	4	—5
Do	do	H. C. Sheldon	27	51	4	—1
CONNECTICUT.						
Pomfret	Windham	Rev. D. Hunt	6	48	4	—8
Columbia	Tolland	Wm. H. Yeomans	8, 27	48	4	—9
Middletown	Middlesex	Prof. John Johnston	27	51	5	—7
New Haven	New Haven	D. C. Leavenworth	20	50	5	—6
Plymouth	Litchfield	D. W. Learned	27	48	4	—10
Colebrook	do	Charlotte Rockwell	6	47	4	—16
NEW YORK.						
Fishkill Landing	Dutchess	Wm. H. Denning	27	49	4	—8
White Plains	Westchester	Oliver R. Willis	27	51	4	—2
Deaf and Dumb Inst	New York city	Prof. O. W. Morris	10	50	4	6
Gouverneur	St. Lawrence	C. H. Russell	18	41	4	—24
Clinton	Oneida	Dr. H. M. Paine	15	50	4	—20

I. FEBRUARY, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date	Minimum temperature.	Mean temperature.	Rain and melted snow.
ont'd.								
				°		°	°	In.
.....	Madison.....	Dr. S. Spooner	26	46	4	—25	21.9	2.25
.....	Jefferson	O. S. Gregory	19	43	4	—26	17.9	3.40
.....	Oswego	Wm. S. Malcolm....	26	44	4	—14	24.0	2.80
.....	Onondaga	W. M. Beauchamp..	15	46	4	—20	24.8	.....
.....	Cayuga	John B. Dill.....	15	44	4	—20	24.7	.....
.....	Tioga	Robert Howell.....	19	49	4	—13	26.3	.....
.....	Seneca.....	Philo Cowing	8	44	4	—13	25.1	.....
.....	Monroe.....	Dr. M. M. Mathews..	26	48	4	—6	26.2	2.44
.....	Niagara	Dr. E. S. Holmes....	26	44	4	—4	25.7	2.02
KY.								
.....	Essex	W. A. Whitehead...	10	51	5	—3	31.4	4.25
.....	Burlington.....	Dr. M. J. Rhees	19	53	5	7	33.8	.....
NIA.								
ill	Lehigh	Edward Kohler.....	12, 27	47	5	—2	30.3	.....
.....	Philadelphia.....	J. A. Kirkpatrick, A. M	10, 27	51	5	7	34.1	3.82
.....	Delaware.....	Dr. Paul Swift	20, 27	51	4, 5	8	34.7	5.26
.....	Bucks.....	Eben'r Hance.....	9	52	5	4	32.3	4.40
.. ....	Lancaster	J. R. Hoffer.....	20	46	24	—1	31.8	3.15
.....	Dauphin	Dr. John Heisely ...	27	47	5	7	31.2	3.68
.....	Adams	M. & H. E. Jacobs..	27	53	4, 25	—1	29.7	4.20
.....	Center.....	Samuel Brugger....	9, 15	48	4	—6	28.6	3.73
.....	Blair	Thomas H. Savery..	15	50	3, 4	5	29.3	.....
.....	Fayette	John Taylor.....	26	62	4	—4	32.3	.....
.....	Washington	Rev. W. Smith, D. D.	26	53	4	—2	30.4	4.14
D.								
.....	Kent.....	Prof. J. R. Dutton..	27	58	4, 5	12	35.4	4.49
.....	St. Mary's.....	Rev. J. Stephenson.	27	62	4	13	38.0	5.14
.....	Carroll	Miss H. M. Baer	27	53	4	2	32.2	3.37
MBIA.								
.....	Washington	Smithsonian Instit'n.	28	57	18	5	36.9	0.36
.....	Montgomery	Wm. M. Stewart	11	68	6	9	41.6	6.46
Y.								
.....	Jefferson	Mrs. L. Young.....	26	61	3	7	34.9	4.12
.....	Ashtabula	Dole & Griffing.....	26	46	23	—2	27.0	3.64
.....	Columbiana	S. B. McMillan	26	56	4	0	30.4	1

I. FEBRUARY, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
OHIO—Continued.				°		°
New Lisbon	Columbiana	J. F. Benner	19	49	4	0
Welshfield	Geauga	B. F. Abell, A. M.	26	49	3	4
Milnersville	Guernsey	Rev. D. Thompson	26	58	7	0
Cleveland	Cuyahoga	Mr. and Mrs. Hyde	9, 26	49	3	8
Kelley's Island	Erie	Geo. C. Huntington	26	46	3	2
Norwalk	Huron	Rev. A. Newton	26	56	4	6
Newark	Licking	Israel Dille	26	57	4	6
Toledo	Lucas	Dr. J. B. Trembley	26	54	3	6
Bowling Green	Wood	Dr. W. R. Peck	26	62	3, 4	9
Urbana	Champaign	Prof. M. G. Williams	26	60	3	5
Bethel	Clermont	George W. Crane	14	53	3	8
Cincinnati	Hamilton	George W. Harper	26	60	3	7
Do	do	R. C. Phillips	14, 26	58	3	12
MICHIGAN.						
Monroe City	Monroe	Miss F. E. Whelpley	26	48	3	2
Ypsilanti	Washtenaw	C. S. Woodard	26	52	3	0
Holland	Ottawa	L. H. Streng	14	54	3, 4	3
Clifton	Kewenaw	Wm. Van Orden, jr.	20, 24	48	12	—20
Marquette	Marquette	Frank M. Bacon	18	43	3	—14
INDIANA.						
Richmond	Wayne	Edward B. Rambo	26	56	3, 23	2
Cadiz	Henry	William Dawson	26	55	3, 22	0
New Castle	do	T. B. Redding, A. M.	26	60	3	2
South Bend	St. Joseph	Jas. H. Dayton	17	48	23	4
Logansport	Cass	Thos. B. Helm	25	56	3	—3
New Harmony	Posey	John Chappellsmith	9	59	6	3
ILLINOIS.						
Chicago	Cook	Samuel Brookes	28	42	3	—12
Riley	McHenry	E. Babcock	14	45	3	—14
Marengo	do	O. P. & J. S. Rogers	14, 17	46	3	—9
Sandwich	De Kalb	N. E. Ballou, M. D.	27	52	3	—10
Ottawa	La Salle	Mrs. E. H. Merwin	25	47	3	—12
Winnebago	Winnebago	James W. Tolman	17	47	3	—12
Pekin	Tazewell	J. H. Riblett	17	48	3	—10
Peoria	Peoria	Frederick Brendel	17	51	3	—4
Waverley	Morgan	Timothy Dudley	14, 15	57	3	—6
Highland	Madison	Ad. F. Bandelier	14	58	3	1
Galesburg	Knox	Prof. W. Livingston	17	47	3	—8
Manchester	Scott	Dr. J. & Miss Grant	14	54	3	—5
Augusta	Hancock	S. B. Mead, M. D.	17	49	3	—10
WISCONSIN.						
Manitowoc	Manitowoc	Jacob Lüps	18	45	3	—13
Milwaukie	Milwaukie	Carl Winkler	14	42	3	—11
Do	do	I. A. Lapham, LL.D.	28	47	3	—12

I. FEBRUARY, 1863—CURRENT WEATHER—Continued.

ce.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
—Cont'd.				°		°	°	*In.*
a.....	Waupaca.....	Wm. Woods	.....	.....	3	—22	.....	.....
.....	Columbia	W. W. Curtis	28	44	3	—15	24.4	2.41
.....	Dane	Prof. J. W. Sterling .	28	43	3	—14	21.6	.....
ge.....	Rock.....	Prof. H. S. Kelsey...	17	49	3	—10	27.3	1.30
.....	Ashland.....	Edwin Ellis.....	18	38	3	—32	7.3	.....
....	Douglas.....	Wm. Mann.....	18	42	3	—26	13.4	i
SOTA.								
r	Lake.....	C. Wieland.....	18	40	2	—24	14.5	1.02
.....	Anoka	O. H. Kelley	18	48	3	—35	16.6	1.60
.....	Ramsey	Rev. A. B. Paterson.	17	40	3	—31	15.3	0.93
'A.								
.....	Clinton	Dr. P. J. Farnsworth	17	48	3	—10	25.9	3.10
.....	Dubuque.....	Dr. Asa Horr.....	17	48	3	—12	23.6	1.66
ice	Buchanan	A. C. Wheaton	17	52	3	—10	26.2	3.00
.....	Johnson.....	T. S. Parvin, A. M.	27	44	3	—17	23.4	2.00
on	Lee	Daniel McCready ...	18	50	3	—12	28.5	3.66
ain	Jefferson	T. McConnel	17	53	3	—12	26.8	1.70
.....	Kossuth	Dr. & Miss L. McCoy	14	49	3	—21	19.6	0.93
URI.								
.....	St. Louis.....	Dr. Geo. Engelman.	14	63	3	2	35.8	3.99
.....	Clark	J. T. Caldwell.....	24	100	9	42	61.4	.....
.....	Lewis	George P. Ray	17	52	3	10	28.6	2.95
AS.								
.....	Douglas	Arthur N. Fuller....	18	55	3	—7	30.6	1.31
.....	Riley.....	Isaac T. Goodnow..	15, 18	53	3	—4	30.1	2.30
.....	Davis	Dr. Fred. P. Drew..	18	52	3	—2	29.8	.....
(A TER.								
ty	Washington	Miss A. M. J. Bowen.	27	46	2	—6	23.5	0.90
.....	Sarpy	Rev. Wm. Hamilton.	18	50	1, 2	2	26.3	0.56
'ON TER.								
.....	Clallam	James G. Swan.....	19, 28	50	8	24	39.7	14.2
RITORY.								
te City ..	G. Salt Lake.....	W. W. Phelps.....	11, 12	40	4, 14	12	27.8	3.74
.....	Washington	H. Pearce.....	12	59	6	20	39.0	0.90
RNIA.								
k.....	Plumas	M. D. Smith	28	60	20	5	35.3	9.60
.....	Yuba	W. C. Beecher	28	69	10	32	48.2	2.43
.....	Sacramento	Dr. Thos. M. Logan.	28	62	10	36	46.5	2.75
sco	San Francisco ...	Dr. W. O. Ayres	27	61	9	38	48.6	3.26
racks ...	Sonoma	Dr. W. W. Hays	27	70	9	34	48.2	3.26

II. FEBRUARY—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years.		Averages. 1860.
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*
Maine	5	16.2	7.25	17.2	1.94	26.4	7.88	15.4	2.04	21.9	3.73	19.4	4.57	22.5
New Hampshire	4	18.8	5.64	17.5	1.53	28.8	2.52	16.6	1.60	23.7	2.26	21.1	2.71	25.2
Vermont	4	17.7	0.98	14.9	0.94	27.8	3.04	14.1	1.20	22.8	1.54	19.5	1.54	18.3
Massachusetts	12	21.2	3.38	20.8	1.09	32.6	2.51	22.4	1.68	28.3	4.17	25.1	2.57	26.2
Rhode Island	1	22.1	4.05	18.7	0.80	32.7	3.26	24.5	2.80	36.6	1.85	26.9	2.53	29.3
Connecticut	4	19.7	4.10	23.0	1.32	32.8	1.45	23.3	2.16	29.3	3.80	25.6	2.57	26.7
New York	18	18.0	1.83	15.6	8.82	32.7	2.45	21.5	2.00	29.8	2.41	25.5	3.50	25.3
New Jersey	4	25.1	3.26	23.7	0.84	37.1	1.77	26.4	2.51	33.4	3.48	29.1	2.37	32.6
Pennsylvania	19	23.0	2.59	22.2	1.14	36.4	1.54	25.6	1.90	33.6	3.13	28.2	2.06	31.1
Delaware	1	.....	....	25.1	....	39.5	....	32.5	1.68	.....	4.38	32.4	3.09	.....
Maryland	5	26.2	2.07	26.1	0.84	40.4	0.68	27.7	1.64	36.9	3.49	31.5	1.74	35.1
District of Columbia	1	27.0	....	27.0	0.64	42.0	0.65	31.0	1.67	39.4	3.54	33.3	1.30	36.7
South Carolina	6	44.2	1.46	45.9	2.06	57.4	1.01	46.3	6.60	51.4	3.92	49.0	3.01	.....
Tennessee	2	35.4	1.30	33.3	2.90	52.5	2.65	36.8	3.21	46.7	7.66	40.9	3.54	41.6
Kentucky	4	30.5	0.86	28.2	3.08	46.5	3.14	30.2	3.06	40.0	7.56	35.1	3.34	34.8
Ohio	19	23.7	1.70	23.2	1.92	39.8	2.50	24.5	2.30	34.0	4.21	29.0	2.53	31.7
Michigan	7	17.0	1.59	14.2	1.17	27.6	4.26	19.0	2.17	27.7	1.69	21.1	2.18	24.4
Indiana	4	27.6	0.75	24.2	0.77	41.9	4.60	25.8	2.00	37.0	5.16	31.3	2.66	32.1
Illinois	13	22.7	0.82	21.3	1.48	34.0	5.18	19.6	1.76	29.7	2.10	25.5	2.27	28.2
Wisconsin	9	13.1	1.23	15.4	0.40	25.8	2.77	16.0	0.89	23.3	1.44	18.7	1.35	21.4
Minnesota	3	7.7	....	12.1	....	10.7	3.30	10.1	0.70	14.6	0.58	11.0	1.33	15.2
Iowa	8	18.3	1.71	16.1	1.33	27.2	5.30	16.5	1.64	26.4	1.92	20.9	2.38	25.2
Missouri	2	29.9	0.63	26.0	3.64	42.1	6.29	29.2	1.81	36.9	5.35	32.8	3.54	41.2
Kansas	3	.....	....	.....	....	29.6	3.60	25.2	0.51	34.6	0.42	29.8	1.51	30.2
Nebraska Territory	3	.....	....	.....	....	.....	....	17.3	0.80	23.8	0.68	20.5	0.74	24.2
California	2	52.7	2.67	52.2	0.44	50.4	4.87	53.9	2.01	51.0	4.58	52.0	2.91	49.2

I. MARCH, 1863—CURRENT WEATHER.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and snow.
				°		°	°	In.
.....	Washington	Wm. D. Dana	26	45	13	—7	22.5	3.76
.....	Penobscot	B. F. Wilbur	22	46	14	—6	23.9	3.70
.....	Waldo	G. E. Brackett	25, 26	45	13	—9	23.0	4.15
.....	Kennebec	Jas. Van Blarcom ...	25	50	14	—5	24.5	5.90
.....	....do	R. H. Gardiner	25, 26	46	14	—12	24.0	4.32
.....	Androscoggin....	Asa P. Moore	22	50	14	—14	24.6	4.45
.....	York	G. W. Guptill	22	44	5, 13	—4	23.2	6.52
RE.								
.....	Rockingham	Elias Nason	22	52	14	—10	28.5	.....
.....	Coos	Fletcher Odell	22	49	13	—16	20.3	2.70
.....	....do	Branch Brown	24, 25	42	5, 13	—20	17.8	.....
.....	Grafton	Rob't C. Whiting ...	25	48	13	—22	20.6	3.00
.....	Belknap	Charles H. Pitman ..	22, 23	45	14	0	26.5	3.80
.....	Sullivan	Arthur Chase	26	48	13	—18	24.0	4.72
.....	Essex	Hiram A. Cutting ...	25	46	5	—27	19.5	4.75
.....	Orleans	Jas. A. Paddock	25	42	13	—13	19.0	3.65
.....	Orange	T F Pollard.	26	45	13	—27	18.0	3.98
.....	Washington	Dr. M M. Marsh	26	47	13	—17	20.0	.....
.....	Chittenden	Rev. McK. Petty	25	47	5	—18	20.3	2.75
.....	Rutland	David Buckland	25	46	13	—21	22.1	3.47
TS.								
.....	Barnstable	Dr. N. Barrows	22	51	13	8	30.9	3.89
.....	Bristol	Samuel Rodman	26	56	5, 15	8	31.5	3.99
.....	Worcester	Henry C. Prentiss ...	25, 26	47	13	—1	27.9	5.78
.....	....do	Jno. G. Metcalf	26	48	13	—6	26.1	.....
....	Hampshire	Prof. E. S. Snell	25	47	13	—6	26.1	5.60
....	Hampden	Rev. E. Davis	26	45	13	—5	26.2	6.17
....	Berkshire	Wm. Bacon	23	49	14	—8	25.0	9.25
D.								
....	Providence	Prof. A. Caswell	24, 30	47	2	19	33.4	4.12
....	....do	H. C. Sheldon	26	51	13	4	30.0	4.79
T.								
....	Windham	Rev. D. Hunt	25	50	5	1	27.0	7.00
....	Tolland	Wm. H. Yeomans ..	22	54	13	6	30.9	.....
....	Middlesex	Prof. Jno. Johnson ..	25	54	13	—1	28.1	4.73
....	New Haven	D. C. Leavenworth .	25	52	13	7	31.0	.....
....	Litchfield	D. W. Learned	25	49	13	—5	25.5	5.76
....	Dutchess	Wm. H. Denning ...	25	58	15	5	28.2	5.70
....	Westchester	Oliver R. Willis	25	54	13	9	32.1	.....
ist..	New York city ..	Prof. O. W. Morris ..	26	55	15	14	35.4	.....
.....	St. Lawrence	C. H. Russell	25	54	5	—15	22.1	2.60

I. MARCH, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.
NEW YORK—Cont'd.				°		°	
Clinton	Oneida	Dr. H. M. Paine	25	50	15	—5	2
Oneida	Madison	Dr. S. Spooner	24, 25	46	20	—9	2
Theresa	Jefferson	S. O. Gregory	25	48	5	—20	2
Oswego	Oswego	Wm. S. Malcolm	25	47	13, 15	4	2
Skaneateles	Onondaga	W. M. Beauchamp	25	55	15	—5	2
Marathon	Cortland	Lewis Swift	11	50	15	—7	2
Auburn	Cayuga	John B. Dill	25	56	15	—2	
Nichols	Tioga	Robert Howell	25	56	13, 15	6	3
Seneca Falls	Seneca	Philo Cowing	25	52	15	0	
Rochester	Monroe	Dr. M. M. Mathews	24	45	5	3	2
Do	do	Prof. C. Dewey	24	46	5	2	
Wilson	Niagara	Dr. E. S. Holmes	24	47	5	7	2
NEW JERSEY.							
Newark	Essex	W. A. Whitehead	25	51	15	12	3
New Brunswick	Middlesex	Geo. W. Thompson	25	64	13	14	3
Mount Holly	Burlington	Dr. M. J. Rhees	25	58	14	18	3
PENNSYLVANIA.							
North Whitehall	Lehigh	Edward Kohler	25	62	13	6	3
Philadelphia	Philadelphia	J. A. Kirkpatrick, A. M	25	63	5	17	3
Fallsington	Bucks	Eben'r Hance	25	62	5	17	3
West Haverford	Delaware	Dr. Paul Swift	25	63	5	12	3
Mount Joy	Lancaster	J. R. Hoffer	25	68	17	11	3
Harrisburg	Dauphin	Dr. Jno. Heisely	25	58	17	16	3
Do	do	W. O. Hickok	25	56	5, 17	18	3
Gettysburg	Adams	M. & H. E. Jacobs	22	58	5	13	3
Connellsville	Fayette	John Taylor	22	55	5	6	
Fleming	Center	Sam'l Brugger	17	53	14	11	
Altoona	Blair	Thos. A. Savery	2	52	5, 12, 13	16	
Canonsburg	Washington	Rev. W. Smith, D. D	22	59	5	11	
MARYLAND.							
St. Mary's City	St. Mary's	Rev. J. Stephenson	25	68	13	22	
Sykesville	Carroll	Miss H. M. Baer	25	63	5	12	
DIST. OF COLUMBIA.							
Washington city	Washington	Smithsonian Institu'n	13	55	21	22	
TENNESSEE.							
Clarksville	Montgomery	Wm. M. Stewart	17	74	4	28	
KENTUCKY.							
Louisville	Jefferson	Mrs. L. Young	17	73	13	23	
OHIO.							
Austinburg	Ashtabula	Dole & Griffing	22	58	13	8	
New Lisbon	Columbiana	J. F. Benner	22	63	13	14	
East Fairfield	do	S. B. McMillan	22	56	13	14	

I. MARCH, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and snow.
inued.								
.....	Geauga	B. F. Abell, A. M ..	22	58	13	9	31.6	3.63
.....	Guernsey	Rev. D. Thompson..	23	70	13	8	34.2	.....
.....	Cuyahoga	Mr.& Mrs.G.A.Hyde	23	62	13	15	34.2	2.85
.....	Erie.....	Geo. C. Huntington.	17	51	13	17	32.0	1.51
.....	Huron	Rev. A. Newton	22	66	13	12	33.7	1.46
.....	Licking	Israel Dille	23	74	13	12	32.1	2.57
.....	Franklin	Prof. Jno. Haywood.	22, 23	66	13	18	36.5	2.09
.....	Lucas	Dr. J. B. Trembly..	17	63	13	16	35.2	2.44
n	Wood	Dr. W. R. Peck	23	68	4	13	36.2	2.70
.....	Champaign	Pf. M. J. Williams..	23	70	4, 13	18	36.2	2.50
.....	Clermont	Geo. W. Crane.....	15, 23	66	5, 13	18	36.3	4.63
.....	Hamilton.....	G. W. Harper	17, 23	71	13	20	40.0	4.37
IN.								
.....	Monroe.....	Miss F. E. Whelpley	17	64	4	17	34.0	2.15
.....	Washtenaw	C. S. Woodard.....	17	61	4	11	31.1	2.17
.....	Ottawa.....	L. H. Streng	22	45	4	13	30.5	3.71
.....	Marquette.....	F. M. Bacon.....	27	43	11	3	23.6	1.88
A.								
.....	Henry	T. B. Redding, A. M.	22	69	13	15	39.0	.....
.....	St. Joseph.....	Jas. H. Dayton	23	62	9	18	34.9	4.49
.....	Cass.....	Thos. B. Helm	22	76	9	15	36.9	4.32
y.....	Posey	Jno. Chappellsmith .	15	74	4, 9	26	44.1	2.55
IS.								
.....	Cook.....	Sam'l Brookes	22, 23, 27	48	9, 12	12	30.3	.....
.....	McHenry	E. Babcock.....	15	50	9, 12	14	30.1	2.84
.....•	....do	O. P. & J. S. Rogers	16	50	12	11	31.3	2.01
.....	De Kalb.....	N. E. Balbou, M. D..	15	58	9	15	35.1	4.44
.....	La Salle.....	Mrs. E. H. Merwin..	14, 15, 22	58	9	16	34.9	3.04
.....	Winnebago.....	Jas. W. Tolman	16	52	12	15	33.2	1.65
.....	Tazewell.....	J. H. Riblett.....	15, 22	60	4	13	35.6	2.56
.....	Peoria.....	Fred'k Brendel	15, 17	63	4	17	38.4	2.60
.....	Morgan	Timothy Dudley....	17	76	4, 9	19	39.3	3.15
.....	Madison.....	Ad. F. Bandelier....	17	70	4	24	41.5	2.50
.....	Knox	Prof. W. Livingston.	22	57	4	13	34.4	1.80
.....	Scott.....	Dr. & Miss E. Grant.	17	74	4	16	38.7	3.77
.....	Hancock	S. B. Mead, M. D ...	17	68	4	15	37.4	2.21
SIN.								
.....	Manitowoc	Jacob Lüps.....	24	47	4	11	31.6	1.25
.....	Milwaukie.....	Carl Winkler.....	24	49	4	14	31.6	2.70
.....	....do	I. A. Lapham, LL.D	24	47	4	11	.....	2.48
.....	Waupaca.....	Wm. Woods.....	16, 31	50	4	10	30.6	.....
.....	Columbia.....	W. W. Curtis	16, 17	50	4	9	30.5	1.75
.....	Dane.....	Prof. J. W. Sterling.	.....	.....	8	11	.....	.....
.....	Rock.....	Prof. H. S. Kelsey..	16	53	3	17	32.6	2.00
.....	Douglas.....	Wm. Mann.....	16	45	4	—8	24.3	....

I. MARCH, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.
MINNESOTA.				°		°	
Beaver Bay	Lake	C. Wieland	21, 30	44	12	—9	
Itasca	Onoka	O. H. Kelley	16, 27	50	7, 9	0	
Forest City	Meeker	Henry L. Smith	20	58	9	—6	
IOWA.							
Lyons	Clinton	Dr. P. J. Farnsworth	16	55	9	14	
Dubuque	Dubuque	Dr. Asa Horr	16	54	9	15	
Independence	Buchanan	A. C. Wheaton	14	59	3, 6	13	
Iowa City	Johnson	T. S. Parvin, A. M.	22	57	9	12	
Fort Madison	Lee	Daniel McCready	22	65	9	14	
Pleasant Plain	Jefferson	T. McConnell	22	72	8	10	
Algona	Kossuth	Dr. & Miss E. M'Coy	14	64	8	5	
MISSOURI.							
St. Louis	St. Louis	Dr. Geo. Engelmann	17	76	4	23	
Athens	Clark	J. T. Caldwell	9, 10	65	22, 23, 24	30	
Canton	Lewis	Geo. P. Ray	17	77	4	14	
Harrisonville	Cass	John Christian	17	81			
KANSAS.							
Lawrence	Douglas	Arthur N. Fuller	17, 21, 22	85	8	16	
Manhattan	Riley	J. T. Goodnow	21	86	4	20	
Fort Riley	Davis	Dr. Fred. P. Drew	14	84	4	20	
NEBRASKA TER.							
Elkhorn City	Washington	Miss A. M. J. Bowen	21	68	4	3	
Bellevue	Sarpy	Rev. W. Hamilton	21	70	4	7	
WASHINGTON TER.							
Neeah Bay	Clallam	James G. Swan	23	56	9	30	
CALIFORNIA.							
Silver Creek	Plumas	M. D. Smith	29, 30, 31	72	10	16	
Marysville	Yuba	W. C. Belcher	31	81	9	37	
Sacramento	Sacramento	T. M. Logan, M. D.	31	75	10	41	
San Francisco	San Francisco	W. O. Ayres, M. D.	31	72	10	42	

II. MARCH—AVERAGES.

ories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years.		Averages. 1863.	
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*
.....	7	27.6	1.20	24.6	1.67	28.3	7.17	28.2	2.66	32.4	9.68	28.2	4.48	23.7	4.68
.....	4	30.9	6.36	25.3	1.19	30.7	2.06	29.5	1.22	32.5	6.51	29.8	3.47	23.0	3.50
.....	6	28.4	0.72	22.2	1.27	27.0	2.24	26.5	1.43	33.8	4.18	27.6	1.97	19.8	3.72
.....	9	32.1	1.69	26.4	1.46	31.3	2.61	32.1	1.81	38.4	5.99	32.1	2.71	27.7	5.78
.....	1	32.6	0.86	29.2	1.55	32.2	3.35	32.8	2.05	40.6	8.00	33.5	3.16	31.7	4.45
.....	4	33.4	0.96	28.3	1.47	32.2	2.66	31.9	2.20	39.6	8.31	33.1	3.12	28.5	5.83
.....	12	30.5	1.53	25.7	1.82	31.0	2.57	32.3	1.18	39.3	5.00	31.8	2.42	27.7	3.45
.....	6	36.8	1.83	30.6	1.74	35.9	3.12	37.4	1.40	45.8	6.40	37.3	2.90	34.1	5.25
.....	7	34.6	2.04	29.2	1.73	35.2	1.63	37.1	0.95	44.5	5.59	36.1	2.39	34.5	4.67
.....	1	.....	....	29.4	....	35.6	....	45.7	0.37	.....	7.05	36.9	3.71	.....	....
.....	3	39.0	3.62	33.5	1.78	38.4	1.62	39.2	0.85	48.8	5.42	39.8	2.66	37.6	3.64
ia...	1	41.6	....	35.4	1.79	39.1	1.91	41.9	1.03	49.6	3.80	41.5	2.14	40.5	6.04
.....	1	53.3	3.75	51.2	5.88	51.1	2.64	59.9	1.97	57.5	4.51	54.6	3.75	.....	....
.....	2	44.9	3.23	41.3	1.67	46.9	0.74	51.3	4.38	54.3	5.24	47.7	3.05	47.4	5.03
.....	1	40.2	5.22	36.0	1.01	39.9	0.56	44.1	1.30	51.2	3.96	42.3	2.41	43.0	4.13
.....	15	35.4	2.80	29.8	1.92	34.5	1.21	37.4	1.36	45.9	4.30	36.6	2.32	34.4	2.97
.....	7	30.3	2.32	22.1	0.99	27.7	1.23	34.8	3.31	38.0	4.07	30.6	2.38	29.8	2.48
.....	6	37.0	4.40	34.3	0.58	37.1	1.25	42.2	2.04	47.2	4.06	39.6	2.47	38.7	3.79
.....	13	34.8	2.66	31.7	0.59	32.1	2.42	40.3	2.85	42.2	4.94	36.2	2.69	35.4	2.71
.....	10	27.5	1.83	24.8	0.32	27.5	1.04	34.7	1.81	35.2	4.26	29.9	1.85	30.2	2.04
.....	2	25.6	....	21.1	....	22.9	1.00	33.7	1.16	30.2	3.03	26.7	1.73	28.9	0.63
.....	10	30.9	1.45	26.3	0.93	29.6	2.11	40.1	2.06	40.6	4.45	33.5	2.20	33.1	1.91
.....	4	39.4	2.45	37.4	1.06	39.5	1.80	48.2	3.53	48.4	7.39	42.4	3.23	43.2	3.17
.....	2	.....	....	.....	....	37.2	2.60	48.0	2.58	46.6	2.78	43.9	2.65	44.4	....
ry...	2	.....	....	.....	....	.....	....	44.7	1.80	39.8	1.73	42.2	1.76	36.1	0.50
.....	2	56.3	4.26	57.5	1.10	56.3	0.74	54.4	3.25	51.6	2.35	55.2	2.34	53.4	2.85

I. APRIL, 1863—CURRENT WEATHER.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
MAINE.				°		°
Perry	Washington	Wm. D. Dana	23	66	2	12
Steuben	do	J. D. Parker	23	62	2	17
Dexter	Penobscot	B. F. Wilbur	23, 28	67	2	13
Belfast	Waldo	George E. Brackett	23	65	2	16
Vassalboro'	Kennebec	Jas. Van Blarcom	28	70	1, 2	17
Gardiner	do	R. H. Gardiner	23	72	1	18
Lisbon	Androscoggin	Asa P. Moore	23	67	2	21
Cornishville	York	G. W. Guptill	28	69	1	14
NEW HAMPSHIRE.						
Shelburn	Coos	F. Odell	23	72	1	17
Stratford	do	Branch Brown	28	68	1	3
Littleton	Grafton	Robert C. Whiting	29	70	1	7
Barnstead	Belknap	Chas. H. Pitman	28	74	1	16
Claremont	Sullivan	Arthur Chase	28	76	1	16
VERMONT.						
Lunenburg	Essex	Hiram A. Cutting	18, 29, 30	64	3, 4	10
Craftsbury	Orleans	Jas. A. Paddock	24	70	1	8
Brookfield	Orange	T. F. Pollard	28	69	1	7
Montpelier	Washington	Dr. M. M. Marsh	23	78	1	14
Burlington	Chittenden	Rev. M'K. Petty	24	67	1	11
Brandon	Rutland	David Buckland	28	79	4	20
MASSACHUSETTS.						
Sandwich	Barnstable	N. Barrows, M. D.	22	68	1	28
New Bedford	Bristol	Sam'l Rodman	27, 28	67	8	25
Worcester	Worcester	Henry C. Prentiss	28	73	8	23
Meudon	do	Jno. G. Metcalf	23	69	8	22
Amherst	Hampshire	Prof. E. S. Snell	25	77	1	21
Westfield	Hampden	Rev. E. Davis	28	75	1	20
Richmond	Berkshire	Wm. Bacon	23	73	1, 4	14
RHODE ISLAND.						
Providence	Providence	Prof. A. Caswell	28	75	1	25
Do	do	H. C. Sheldon	28	76	1	24
CONNECTICUT.						
Pomfret	Windham	Rev. D. Hunt	28	72	8	21
Columbia	Tolland	Wm. H. Yeomans	28	72	4	28
Middletown	Middlesex	Prof. Jno. Johnston	28	75	1	20
New Haven	New Haven	D. C. Leavenworth	28	70	1, 4	28
Plymouth	Litchfield	D. W. Learned	28	71	1	17
Colebrook	do	Charlotte Rockwell	23	74	1	19

I. APRIL, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
RK.				°		°	°	In.
mb Inst.	New York city...	Prof. O. W. Morris ..	28	72	4	30	49.0	5.69
.....	Westchester	Oliver R. Willis.....	27	73	4	28	47.8	.....
.....	St. Lawrence....	C. H. Russell	23	68	1	15	41.6	1.66
.....	Oneida	Dr. H. M. Paine.	11	75	1	16	47.5	1.07
.....	Madison.....	Dr. S. Spooner	23, 28	72	1	16	44.3	3.37
.....	Jefferson	S. O. Gregory.....	23	66	1	8	40.9	2.59
.....	Oswego	Wm. S. Malcolm	11	64	1	16	41.7	6.25
.....	Onondaga	W. M. Beauchamp ..	28	72	1	17	43.4	.....
.....	Cortland.....	Lewis Swift	28	78	1	16	41.8	.....
.....	Cayuga.....	John B. Dill..	28	72	1	10	42.5	.....
.....	Tioga	Robert Howell	28	80	1	20	43.6	.....
.....	Monroe	Dr. M. M. Mathews..	11	73	1	15	43.0	2.79
.....	....do	Prof. C. Dewey.....	11	75	1	16	43.2	2.79
.....	Niagara	Dr. E. S. Holmes	11	74	1	13	43.2	.....
SEY.								
.....	Essex	W. A. Whitehead ..	28	71	4	28	47.3	5.84
wick	Middlesex.	Geo. W. Thompson..	12	74	1, 4	30	46.7	.....
.....	Burlington	Dr. M. J. Rhees	12	72	1, 4	31	48.7	.....
.....	....do	Thos. J. Beans.....	12	74	4	31	50.2	.....
ANIA.								
ehall....	Lehigh	Edward Kohler.....	28	77	7	17	46.5	.....
.....	Philadelphia	J. A. Kirkpatrick, A.M	12	70	4	31	48.6	7.29
.....	Bucks.....	Eben'r Hance	12	72	4	30	49.0	8.00
ford	Delaware	Dr. Paul Smith.....	12	73	4	28	47.4	7.43
.....	Lancaster	J. R. Hoffer.....	11	77	4	29	48.8	5.30
g.....	....do	H. G. Bruckhart	11	77	4	29	48.0	.....
.....	Dauphin	Dr. John Heisely....	11	70	4	30	49.0	4.17
.....	....do	Wm. O. Hickok	11	74	4	30	49.4	5.51
.....	Adams	M. & H. E. Jacobs ...	11	73	1, 4	26	43.6	4.28
e	Fayette	John Taylor.....	11	70	1, 4	18	44.0	.....
.....	Center	Samuel Brugger....	27	74	1	22	46.3	5.07
.....	Indiana	W. R. Boyers	25	49	1	19	34.5	14.00
.....	Blair	Thos. H. Savery	11	72	1	21	46.6	12.50
.....	Washington	Rev. W. Smith, D.D.	11	72	1	18	46.3	2.47
ND.								
ity	St. Mary's.....	Rev. J. Stephenson..	29	69	4	34	49.0	3.50
.....	Carroll	Miss H. M. Baer.....	11	73	1, 4	27	46.5	6.75
LUMBIA.								
.....	Washington	Smithsonian Instit'n	27	72	2, 4	36	49.6	6.82
SEE.								
.....	Montgomery	Wm. M. Stewart	18	85	1	32	57.7	3.27
CKY.								
.....	Jefferson	Mrs. L. Young	10	79	1	23	54.8	3

Place.	County.	Observer.
OHIO.		
Austinburg	Ashtabula	Dole & Griffin
New Lisbon	Columbiana	J. F. Benner
East Fairfield	do	S. B. McMillan
Welshfield	Geauga	B. F. Abell, A.
Milnersville	Guernsey	Rev. D. Thomp
Cleveland	Cuyahoga	Mr. & Mrs. G. A
Kelley's Island	Erie	Geo. C. Huntin
Norwalk	Huron	Rev. A. Newto
Newark	Licking	Israel Dille
Westerville	Franklin	Prof. Jno. Hay
Portsmouth	Scioto	L. Engelbrecht
Toledo	Lucas	Dr. J. B. Trem
Bowling Green	Wood	Dr. W. R. Peck
Urbana	Champaign	Prof. M. G. Wi
Bethel	Clermont	Geo. W. Crane
Cincinnati	Hamilton	Geo. W. Harpe
Do	do	R. C. Phillips
MICHIGAN.		
Monroe City	Monroe	Miss F. E. Wh
Ypsilanti	Washtenaw	C. S. Woodwar
Holland	Ottawa	L. H. Streng
Marquette	Marquette	Frank M. Bac
INDIANA.		
Richmond	Wayne	John Haines
New Castle	Henry	T. B. Redding,
South Bend	St. Joseph	Reuben Burro
Logansport	Cass	Thos. B. Helm
Rockville	Parke	Miss M. A. And
New Harmony	Posey	Jno. Chappelis
ILLINOIS.		
Chicago	Cook	Samuel Brook
Riley	McHenry	E. Babcock
Sandwich	De Kalb	Dr. N. E. Ballo
Ottawa	La Salle	Mrs. E. H. Mer
Winnebago	Winnebago	Jas. W. Tolma
Elmira	Stark	O. A. Blanchar
Pekin City	Tazewell	J. H. Riblett
Peoria	Peoria	Frederick Bren
Waverly	Morgan	Timothy Dudl
Highland	Madison	Ad. F. Bandelic
Galesburg	Knox	Prof. W. Living
Manchester	Scott	Dr. & Miss E. C

I. APRIL, 1863—CURRENT WEATHER—Continued.

e.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
SSIN.				°		°	°	In.
.....	Manitowoc	Jacob Lüps.....	27	64	7	28	44.7	2.39
.....	Milwaukie.....	I. A. Lapham, LL.D.	24	67	1	22	.....	1.04
.....	....do	Carl Winkler.....	24	62	1,7	29	44.4	1.30
a.....	Waupaca	Wm. Woods	24	81	8	22	48.2	.....
.....	Columbia.....	W. W. Curtis	18	81	7	26	48.1	1.44
.....	Dane.....	Prof. J. W. Sterling .	18	78	3,7	27	42.5	.....
.....	Rock.....	Henry D. Porter....	18	82	6	28	48.8	0.97
.....	Douglas.....	Wm. Mann	30	70	3	20	38.4	0.10
OTA.								
.....	Lake	C. Wieland	27	69	3	16	39.6	0.71
.....	Ramsey	Rev. A. B. Paterson .	17	76	3	21	48.4	0.80
.....	Hennepin	Mary A. Grave	17	76	3	20	49.4	.....
.....	Meeker	Henry L. Smith.....	17	80	11	36	51.2	.....
A.								
.....	Clinton.....	Dr. P. J. Farnsworth	18	75	13	28	49.1	0.90
.....	Dubuque.....	Dr. Asa Horr	24	75	8	32	51.8	0.25
ce.....	Buchanan	A. C. Wheaton	17	80	3	30	51.7	2.40
.....	Johnson.....	T. S. Parvin, A. M...	17	82	3,8	26	47.3	0.55
on.....	Lee	Daniel McCready...	15	81	1	27	51.7	1.78
.....	Kossuth	Dr. & Miss L. McCoy	17	84	11	28	49.4	0.58
URI.								
.....	St. Louis.....	Augs. Fendler	17, 18	83	1	33	54.9	1.56
.....	....do	Dr. Geo. Engelman..	18	83	1	33	56.5	1.55
.....	Clark	I. T. Caldwell.....	11	50	17	28	34.1	.....
.....	Lewis.....	George P. Ray.....	30	79	1	27	51.6	1.25
le.....	Cass	John Christian.....	17	88	4	38	60.2	.....
AS.								
.....	Douglas	Arthur N. Fuller....	17	86	3	39	58.5	0.07
.....	Riley.....	Isaac T. Goodnow..	17	93	20	39	61.2	9.12
.....	Davis	Dr. Fred. P. Drew..	17	89	12	44	58.2	2.03
A TER.								
ty.....	Washington	Miss A. M. J. Bowen	17	88	3	27	53.8	.....
.....	Sarpy	Rev. Wm. Hamilton.	17	80	3	31	52.3	0.75
TON TER.								
.....	Clallam	James G. Swan	11	60	7, 14	36	47.3	4.7
RNIA.								
k.....	Plumas	M. D. Smith	2, 29, 30	76	18	32	46.7	5.60
.....	Yuba	Wm. C. Belcher.....	30	86	10	42	58.7	1.26
.....	Sacramento	T. M. Logan, M. D..	2	80	1	49	59.5	1.69
sco	San Francisco ...	U. O. Ayres, M. D...	1	74	23	47	54.2	2.09

II. APRIL—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years	
		Mean temp.	Mean rain.	Mean. temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*I*
Maine	6	38.4	6.38	42.6	2.78	39.0	6.65	39.7	4.15	38.6	3.36	39.7	4.
New Hampshire	4	42.2	4.73	44.3	2.20	39.9	6.22	41.0	2.94	36.1	2.70	40.7	3.
Vermont	4	40.5	1.61	44.2	1.20	38.7	4.96	40.9	2.23	38.2	2.30	40.5	2.
Massachusetts	12	43.6	4.95	45.4	3.23		7.25	45.1	3.29	42.9	3.46	43.7	4.
Rhode Island	1	44.1	2.59	48.8	2.80	1.	6.29	46.2	3.63	44.2	2.28	44.9	3.
Connecticut	4	44.2	3.31	47.2	3.99		6.65	44.9	3.75	44.1	3.18	44.3	4.
New York	18	44.4	2.78	47.2	2.39	39.	5.88	45.8	3.26	43.3	4.97	44.0	3.
New Jersey	4	49.1	1.85	50.4	2.60	42.8	6.94	48.9	3.95	46.9	5.00	47.6	4.
Pennsylvania	19	49.7	2.29	50.2	3.51	1.3	4.13	49.2	3.73	48.4	5.36	47.8	3.
Delaware	1	.....	.....	52.1	.....	50.	.....	58.4	3.93	.....	3.93	53.5	3.
Maryland	4	54.7	1.32	52.9	2.90	47.5	3.12	50.9	3.82	50.8	5.11	51.3	3.
District of Columbia	1	55.7	.....	54.7	2.68	45.3	2.40	53.4	3.66	52.2	4.69	52.3	3.
South Carolina	5	64.9	0.89	64.6	0.63	56.5	2.92	64.2	2.59	62.9	2.48	62.6	1.
Tennessee	2	64.9	3.25	59.4	4.18	49.7	5.72	60.1	4.86	57.9	5.79	58.4	4.
Kentucky	4	60.6	1.63	58.8	1.63	42.2	4.46	56.5	4.72	54.2	5.93	54.4	3.
Ohio	20	55.9	2.30	53.2	1.67	40.1	3.01	51.0	4.80	47.8	5.65	49.6	3.
Michigan	7	49.2	4.78	45.0	1.87	35.4	2.96	44.7	3.99	40.9	3.47	43.0	3
Indiana	5	57.1	5.02	56.5	0.81	42.1	2.15	53.9	5.19	49.6	5.13	51.9	3
Illinois	13	58.6	2.16	51.8	1.93	38.7	1.56	49.8	5.17	44.9	3.55	49.4	2
Wisconsin	9	50.2	2.03	45.7	3.04	35.4	2.45	42.6	4.32	36.0	4.28	42.0	3
Minnesota	3	51.9	.....	41.4	4.77	29.8	2.68	39.4	2.92	34.8	2.28	39.5	3
Iowa	8	55.6	2.27	51.7	3.33	36.8	1.35	46.5	5.48	37.7	3.34	45.7	3
Missouri	2	62.2	1.79	60.1	6.35	43.5	1.72	56.2	4.67	51.9	4.89	54.8	3
Kansas	3	.....	.....	.....	.....	41.6	0.33	52.5	3.49	50.3	2.67	48.1	
Nebraska Territory	2	.....	.....	.....	.....	.....	.....	48.2	5.05	41.4	1.64	44.8	
California	3	.....	.....	58.5	1.19	61.0	0.00	59.7	0.96	55.4	2.49	58.6	

I. MAY, 1863—CURRENT WEATHER.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
MAINE.				°		°	°	*In.*
Reuben	Washington	J. D. Parker	22	89	8, 15	37	51.0	4.00
Foxcroft	Piscataquis	Mark Pitman	30	85	15	34	54.3	.....
Belfast	Waldo	Geo. E. Brackett	22	87	7	33	54.9	3.4
Lisbon	Androscoggin	Asa P. Moore	22	92	7	38	55.9	2.22
Cornishville	York	G. W. Guptill	22	92	7	34	56.6	2.12
NEW HAMPSHIRE.								
Littleton	Grafton	Robt. C. Whiting	23	89	3	30	55.8	4.5
VERMONT.								
Lunenburg	Essex	Hiram A. Cutting	21	88	6	40	57.1	3.52
Craftsbury	Orleans	James A. Paddock	23	84	3, 5	32	53.4	4.33
Burlington	Chittenden	Rev. McK. Petty	23	82	3	32	55.2	6.88
Brandon	Rutland	Daniel Buckland	21, 23	88	3	33	56.7	7.56
MASSACHUSETTS.								
Sandwich	Barnstable	N. Barrows, M. D.	22	83	7	38	53.7	3.62
New Bedford	Bristol	Samuel Rodman	22	83	8	42	57.1	3.52
Sendon	Worcester	Jno. Geo. Metcalf	22	90	7	36	57.5	2.10
Amherst	Hampshire	Prof. E. S. Snell	22	88	7	38	58.9	3.59
Richmond	Berkshire	William Bacon	22, 23	90	7	36	60.7	.....
CONNECTICUT.								
Pomfret	Windham	Rev. D. Hunt	22	86½	7	35	56.3	2.15
Middletown	Middlesex	Prof. Jno. Johnston	22	91½	7	38	59.9	1.74
New Haven	New Haven	D. C. Leavenworth	22	87	7	39	59.0	.....
Plymouth	Litchfield	Dwight W. Learned	23	87	7	34	57.8	6.10
NEW YORK.								
Fishkill Landing	Dutchess	W. H. Denning	21	86	7	38	57.2	3.32
Deaf and Dumb Asy	New York city	Prof. O. W. Morris	23	88½	5	41	63.0	4.57
Louverneur	St. Lawrence	C. H. Russell	22	82	5	34	56.0	2.13
Clinton	Oneida	H. M. Paine, M. D.	29	88	7	39	61.4	2.97
Theresa	Jefferson	S. O. Gregory	30	83	3	35	55.8	2.65
Oswego	Oswego	Wm. S. Malcolm	29	76	6	38	54.9	5.00
Skaneateles	Onondaga	W. M. Beauchamp	22	85	6	36	54.2	.....
Nichols	Tioga	Robert Howell	29	90	6, 7	39	59.7	.....
Rochester	Monroe	M. M. Mathews, M. D	22	85	6	36	57.7	1.83
Wilson	Niagara	E. S. Holmes, D.D.S	22	85	4, 5, 6, 7	39	60.5	.....
NEW JERSEY.								
Newark	Essex	W. A. Whitehead	22	87½	7	38	60.5	4.49
New Brunswick	Middlesex	Geo. W. Thompson	23	92	6	40	60.4	.....
Progress	Burlington	Thos. J. Beans	23	95	6, 7, 8	45	65.9	.97

I. MAY, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.
PENNSYLVANIA.				°		°	
Philadelphia	Philadelphia	J. A. Kirkpatrick, A. M	23	89	6, 7	41	6
Harrisburg	Dauphin	Heisely & Hickok	23	89	7	42	6
Blairsville	Indiana	W. R. Boyers	27	74	12	34	5
Fleming	Center	Samuel Brugger	24	92	6	42	6
Canonsburg	Washington	Rev. W. Smith, D. D	21	82	7, 9	40	6
MARYLAND.							
Chestertown	Kent	Prof. J. R. Dutton	23	88	6, 7	43	6
Schellman's Hills	Carroll	Harriott M. Baer	23, 24	85	6, 7	40	6
DIST. OF COLUMBIA.							
Washington	Washington	Smithsonian Inst	24	88	7	44	6
OHIO.							
Austinburg	Ashtabula	Dole & Griffing	23, 29	88	7	38	5
New Lisbon	Columbiana	J. F. Benner	23	92	1, 7	42	6
Welshfield	Geauga	B. T. Abell, A. M	22, 23	86	6, 7	41	6
Kelly's Island	Erie	Geo. O. Huntington	22	84	5	40	5
Westerville	Franklin	Prof. Jno. Haywood	22, 23	85	6	42½	6
Portsmouth	Sciota	L. Englebrecht	23	83	7, 8	48	6
Toledo	Lucas	J. B. Trembly, M. D	22, 23	92	6	41	6
Bowling Green	Wood	W. R. Peck, M. D	23	92	5, 6	42	6
Troy	Miami	Charles L. McClung	23	90	7	42	6
Cincinnati	Hamilton	Geo. W. Harper	28	91	7	44	6
MICHIGAN.							
Monroe	Monroe	Flor. E. Whelpley	11	86	5	38	
Ypsilanti	Washtenaw	C. S. Woodard	22	88	5	35	
INDIANA.							
New Albany	Floyd	E. S. Crozier, M. D	22, 23	87	7	48	
South Bend	St. Joseph	Reuben Burroughs	21	88	5	37	
Rockville	Park	Miss M. A. Anderson	10, 21, 22	82	6	38	
New Harmony	Posey	Jno. Chappellsmith	21	87	6	41	
ILLINOIS.							
Chicago	Cook	Samuel Brooks	22	86	5, 6	34	
Riley	McHenry	E. Babcock	20, 21	80	5, 6	34	
Ottawa	La Salle	Emily H. Merwin	22	88	6	37	
Winnebago	Winnebago	James W. Tolman	22	84	5	37	
Peoria	Peoria	Frederick Brendel	11, 24	87	5	39	
Waverley	Morgan	Timothy Dudley	10, 21	85	6	36	
Lombard University	Knox	Prof. W. Livingston	21	82	5	40	
Manchester	Scott	Dr. & Miss E. Grant	10	86	5	36	
Augusta	Hancock	S. B. Mead, M. D	10	86	5	39	

I. MAY, 1863—CURRENT WEATHER—Continued.

lace.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
CONSIN.				°		°	°	In.
ie.....	Milwaukie.....	I. A. Lapham, LL.D	20	84	5	32	58.8	5.21
ld.....	Walworth.....	Wm. H. Whiting ...	21	84	5, 7	33	57.1	.....
.....	Dane.....	Pf. Jno. W. Sterling.	22	81	5	38	58.0	.....
.....	Douglas.....	William Mann.....	20	90	6	33	52.1	2.67
NESOTA.								
y	Lake.....	C. Welland.....	20	84	2	33	52.0	1.01
.....	Ramsay	Rev. A. B. Paterson.	20	86	5	39	59.9	2.87
.....	Meeker.....	Henry L. Smith	19	90	5, 7, 9	40	59.9	.....
OWA.								
e.....	Dubuque.....	Asa Horr, M. D.....	20	86	5	42	63.0	1.73
ownship	Buchanan	A. C. Wheaton	20, 21	85	6	40½	62.5	7.50
.....	Johnson	T. S. Parvin, A. M..	20	80	7	36	58.7	4.56
dison.....	Lee	Daniel McCready	20, 24	85	5, 6	40	64.5	1.35
t Plain.....	Jefferson	T. McConnell.....	21	92	5, 7	38	65.0	1.93
.....	Kossuth	Dr. & Miss McCoy..	20	88	5	40	62.3	4.21
SSOURI.								
s.....	St. Louis.....	Aug. Fendler.....	28	88	6	40	64.9	2.45
.....	Clark.....	L. T. Caldwell	29	41	7, 11	32	36.3	.....
.....	Lewis	George P. Ray.....	10, 21	90	6	41	64.7	2.36
ANSAS.								
ce	Douglas.....	Arthur N. Fuller ...	24	90	6	46	69.5	4.87
BRASKA.								
a City.....	Washington	Miss A. M. J. Bowen	19, 20	86	5	45	63.8	.....
e.....	Sarpy	Rev. Wm. Hamilton.	15.	87	6. 23	40	63.0	3.88

II. MAY—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years	
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*
Maine	6	49.7	3.4	49.6	5.7	51.7	4.1	50.1	3.5	54.7	3.5	51.1	4.1
New Hampshire	3	51.7	1.1	52.1	4.6	54.5	6.0	51.7	3.6	51.2	2.2	52.9	3.5
Vermont	4	54.2	0.2	51.7	3.0	52.1	4.8	52.3	3.3	57.9	1.8	53.8	2.6
Massachusetts	12	55.1	2.9	53.1	6.3	54.6	5.2	52.8	3.1	57.6	4.8	54.5	4.5
Connecticut	4	55.3	2.2	53.1	5.5	54.1	5.2	53.1	2.8	57.5	4.0	54.6	4.0
New York	17	56.7	2.8	54.0	3.3	53.9	1.6	54.1	4.4	61.5	2.8	56.0	3.6
New Jersey	4	60.2	2.7	57.3	4.0	56.6	8.1	55.4	4.7	60.6	1.8	58.0	4.2
Pennsylvania	19	61.1	3.0	58.5	2.8	57.7	6.6	57.8	7.4	61.3	2.1	59.9	4.4
Delaware	1	.....	....	57.8	....	60.2	....	61.7	4.80	.....	3.40	62.9	4.1
Maryland	4	64.0	2.6	62.1	3.5	61.8	6.3	59.0	6.7	64.1	3.5	62.2	4.5
District of Columbia	1	61.2	1.4	55.3	4.2	61.3	5.7	60.9	7.3	64.8	3.9	61.3	4.5
South Carolina	6	72.7	4.50	70.8	1.20	69.5	2.42	72.2	2.80	70.2	2.52	71.1	3.2
Tennessee	2	67.5	3.90	63.7	6.30	64.0	5.30	67.4	6.07	69.2	2.46	66.4	4.8
Kentucky	4	66.2	3.07	64.1	2.54	70.3	6.23	64.4	6.35	69.0	1.72	64.6	3.9
Ohio	30	62.4	3.8	60.3	2.9	55.3	5.0	58.8	7.3	65.5	2.6	60.4	4.3
Michigan	7	59.1	1.5	52.9	3.9	52.1	3.3	52.3	6.1	56.9	2.9	54.6	3.5
Indiana	5	64.5	3.5	61.9	3.0	57.4	4.4	60.7	8.9	67.1	2.2	62.3	4.4
Illinois	13	64.1	5.1	61.0	4.4	56.5	2.9	58.2	8.1	63.3	1.3	60.6	5.9
Wisconsin	6	60.3	3.1	55.0	3.5	50.4	4.1	52.1	6.8	56.8	1.3	54.9	4.5
Minnesota	3	60.9	....	58.9	1.2	52.4	2.8	51.7	2.8	53.5	5.6	55.5	3.6
Iowa	9	62.9	3.2	60.8	3.5	56.2	7.3	55.7	7.3	63.2	5.4	59.8	5.3
Missouri	2	66.8	7.2	62.1	3.0	59.2	3.1	64.0	10.6	68.2	6.6	64.1	5.4
Kansas	3	.....	....	.....	....	55.8	2.7	61.7	5.2	66.6	8.0	60.7	5.5
Nebraska Territory	3	.....	....	.....	....	.....	....	53.1	4.4	64.6	5.6	58.6	5.0
California	2	.....	....	61.9	1.9	61.6	....	62.3	0.2	63 0	1.3	62.7	1.1

I. JUNE, 1863—CURRENT WEATHER.

ace.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
INE.				°		°	°	In.
.....	Penobscot	B. F. Wilbur	29	86	21	49	60.81	3.09
.....	Androscoggin....	Asa P. Moore.....	28	87	5	50	62.58	1.38
.....	York	Silas West.....	28	87	21	46	56.00	.....
.....	....do	G. W. Guptill	28	85	8	50	62.88	1.91
MPSHIRE.								
.....	Coos	Branch Brown.....	29	84	7	43	58.66	2.70
.....	Belknap.....	Charles H. Pitman..	28	87	9	50	63.20	.....
MONT.								
g.....	Essex	H. A. Cutting	28	93	4	40	61.70	1.47
y	Orleans	James A. Paddock..	27	83	16	44	58.02	2.83
n	Chittenden	Rev. McK. Petty....	28	79	8	49	61.08	1.95
.....	Rutland.....	David Buckland....	29	86	7	48	64.53	1.89
HUSETTS.								
.....	Barnstable	N. Barrows, M. D...	30	78	17	53	61.01	2.30
.....	Essex	John H. Caldwell...	15	87	10	50	62.36	1.50
ord	Bristol	Samuel Rodman	15	81	8	53	62.45	2.49
.....	Worcester	Henry C. Prentiss ..	15	85½	20	51	64.01	1.80
.....	....do	John Geo. Metcalf..	15	86	13	52	63.19	.90
rille.....	....do	Rev. E. Dewhurst ..	28	82	17	50	57.10	.....
CTICUT.								
.....	Hartford	Jarvis Case.....	15	62	29	46	52.26	.....
.....	Litchfield	Charlotte Rockwell..	15	83	9	50	62.37	.....
YORK.								
anding....	Dutchess	Wm. H. Denning...	15	89	4	53	62.27	1.91
s P. O	Putnam	Thomas B. Arden...	15	85	7	54	64.00	.....
.....	New York.....	Prof. O. W. Morris..	15	90	7	56	69.37	1.43
ur	St. Lawrence	C. H. Russell	28	86	6	48	62.75	1.28
.....	Madison	Dr. Stillman Spooner	28	84	17	46	62.43	3.18
.....	Jefferson	S. O. Gregory	27	85	6	48	61.99	2.38
.....	Oswego	E. B. Bartlett.....	28	84	3	48	62.43	.....
rille.....	Onondaga	John Bowman	28	80	4	48	62.00	.....
es	....do	W. M. Beauchamp..	15	82	3	47	61.30	.....
....	Cortland.....	Lewis Swift	11	85	4	41	57.51	.....
.....	Tioga	Robert Howell.....	15	90	8	51	58.30	.....
.....	Monroe.....	Prof. Chester Dewey	15	86	7	48	65.58	1.37
.....	Erie.....	Wm. Ives	29	90	1	49	62.00	1.42
JERSEY.								
.....	Essex	W. A. Whitehead...	15	87	4	50	65.00	10.45
lly	Burlington	M. J. Rhees, M. D ..	15	87	14	57	67.16	.....

I. JUNE, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
PENNSYLVANIA.				°		°
Byberry	Philadelphia	Isaac C. Martindale	15	86	7	53
Susquehanna Depot	Susquehanna	H. H. Atwater	15	92	8	53
Fallsington	Bucks	Ebenezer Hance	15	88	7	57
Haverford	Delaware	Paul Swift, M. D	17	84	8	50
Silver Spring	Lancaster	H. G. Bruckhart	17	93	7	56
Berwick	Columbia	J. E. Berwick	17	89	4	50
Harrisburg	Dauphin	John Heisely	17	92	7	59
Blairsville	Indiana	W. R. Boyers	15	74	8	30
Canonsburg	Washington	Rev. W. Smith, D. D	15	88	4	46
MARYLAND.						
Chestertown	Kent	Prof. J. R. Dutton	17	89	8	57
Schellman's Hills	Carroll	Harriott M. Baer	17	88	8	58
DIST. OF COLUMBIA.						
Washington	Washington	Smithsonian Institu'n	18	94	8	53
OHIO.						
Austinburg	Ashtabula	Dole & Griffing	17	89	6	49
New Lisbon	Columbiana	J. F. Benner	17	90	4	40
Welshfield	Geauga	B. F. Abell, A. M	17	90	7	53
Milnersville	Guernsey	Rev. D. Thompson	17	93	8	38
Hudson	Summit	Prof. C. A. Young	17	90	6	51
Kelly's Island	Erie	Geo. C. Huntington	17	86	6	58
Norwalk	Huron	Rev. A. Newton	17	91	8	50
Newark	Licking	Israel Dille	17	94	8	46
Westerville	Franklin	Prof. Jno. Haywood	17	91	7	50
Toledo	Lucas	J. B. Trembly, M. D	17	95	6	49
Urbana University	Champaign	Prof. M. G. Williams	17	92	8	53
Bethel	Clermont	Geo. W. Crane	17	91	7	51
Cincinnati	Hamilton	R. C. Phillips	17	90	9	58
MICHIGAN.						
Monroe	Monroe	F. E. Whelpley	17	93	5	49
Marquette	Marquette	Frank M. Bacon	14	94	5	43
INDIANA.						
South Bend	St. Joseph	Reuben Burroughs	28	92	8	49
Rockville	Park	Miss M. A. Anderson	16	92	3	46
New Harmony	Posey	John Chappellsmith	17	90	4	55
ILLINOIS.						
Riley	McHenry	E. Babcock	16	93	1	44
Sandwich	De Kalb	N. E. Ballou	15	92	7	55
Elmira	Stark	O. A. Blanchard	16	95	7	55

I. JUNE, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
Cont'd.				°		°	°	In.
.....	Lee	J. Thomas Little....	15	94	7	44	63.19	7.68
.....	Peoria.....	Frederick Brendell..	17	93	2	52	70.50	.45
.....	Morgan.....	Timothy Dudley....	15	96	8	51	68.05	.85
.....	Knox.....	Wm. Livingston....	16	91	7	49	69.06	.....
.....	Scott	John and Ellen Grant	16	92	3	48	67.16	.80
.....	Hancock	S. B. Mead	16	90	21	50	67.99	.85
.....	Manitowoc	Jacob Lipps.....	14	92	3	50	63.44	1.67
.....	Milwaukie	Carl Winkler	14	90	6	47	62.20	0.87
.....	Walworth	W. H. Whitney	16	92	3	50	61.80	.....
.....	Columbia.....	W. W. Curtis.....	20	84	6	40	59.21	.....
TA.								
.....	Meeker.....	Henry L. Smith	14	94	2	48	61.09	.97
.....	Clinton.....	P.J.Farnsworth,M.D	14	94	7	46	68.00	1.20
.....	Buchanan	Alex.Camp Wheaton	16	94	7	52	69.74	.10
.....	Lee	Daniel McCready ...	15	94	3	52	70.80	[illegible]
.....	Kossuth	Dr. F. & Miss McCoy	12	94	5	48	[illegible]	[illegible]
RL.								
.....	Clark	J. T. Caldwell.....	14	98	7	54	76.69	.....
.....	Lewis	George P. Ray	16	100	7	60	76.80	.65
.....	Cass	John Christian.....	27	92	8	56	71.29	.....
S.								
.....	Riley.....	Isaac T. Goodnow ..	27	92	22	53	70.17	5.95
.....	Davis	W. F. McAlister....	27	94	9	57	72.84	4.96
.....	Washington	Miss A. M. J. Bowen.	27	96	21	52	67.89	.....
.....	Sarpy	Rev. Wm. Hamilton.	27	90	20	48	67.50	2.84

II. JUNE—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years.	
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*
Maine	6	61.7	6.1	63.8	2.9	59.3	3.7	63.3	2.1	60.3	7.2	61.7	4.4
New Hampshire	4	63.9	3.8	67.2	2.0	61.8	3.3	67.4	2.3	53.7	5.1	62.8	3.3
Vermont	5	60.7	8.4	64.3	2.5	61.2	4.9	67.6	3.8	62.0	4.0	63.6	4.7
Massachusetts	12	54.3	4.0	66.6	3.0	62.5	2.5	66.9	4.7	63.6	6.5	62.8	4.1
Connecticut	4	61.8	4.1	67.4	2.7	62.1	3.1	62.1	3.9	62.9	7.3	63.9	4.3
New York	17	63.2	5.5	68.3	3.1	63.4	6.8	60.7	4.1	62.9	4.0	65.5	4.7
New Jersey	4	68.8	5.5	72.2	2.8	67.0	6.6	72.8	4.2	67.3	3.5	69.6	4.5
Pennsylvania	19	67.3	8.2	72.5	2.9	67.4	7.4	73.6	4.4	67.7	3.7	69.7	5.3
Delaware	1	68.9	....	.....	...	69.9	....	76.4	2.25	.....	7.28	71.7	4.81
Maryland	5	70.8	5.7	75.0	3.0	72.4	8.3	73.8	3.8	69.7	3.6	72.3	4.9
District of Columbia	1	71.2	5.6	74.7	5.9	71.6	6.5	76.4	1.4	71.4	5.0	73.0	4.9
South Carolina	6	75.5	5.77	79.7	3.99	78.1	2.57	78.4	2.21	76.6	4.55	77.7	3.82
Tennessee	2	71.0	5.07	77.6	1.93	73.9	3.60	75.1	5.07	72.2	4.28	74.0	3.99
Kentucky	4	70.8	6.34	76.7	2.81	69.7	4.93	74.8	4.06	72.0	3.28	73.0	4.29
Ohio	19	68.5	8.5	73.0	3.4	67.5	5.2	72.9	5.2	66.8	4.4	69.7	5.4
Michigan	7	63.5	8.4	68.8	4.6	63.4	3.7	70.1	3.9	61.3	3.3	65.4	4.9
Indiana	5	68.6	5.2	76.5	2.1	68.0	4.7	73.5	5.6	69.9	4.7	71.3	4.5
Illinois	14	67.8	2.8	75.1	2.6	62.6	3.9	72.8	5.8	66.6	2.9	69.0	3.6
Wisconsin	9	63.7	3.9	64.5	4.1	62.1	1.5	69.0	5.3	62.3	5.1	64.3	4.6
Minnesota	3	66.7	5.0	67.4	2.8	64.5	4.1	67.7	2.8	59.8	6.5	65.2	4.2
Iowa	8	68.4	5.0	73.5	1.9	64.3	1.8	72.2	6.4	66.2	5.6	69.7	4.1
Missouri	2	71.6	1.3	79.5	1.1	70.6	2.6	76.5	6.7	72.5	11.0	60.1	5.9
Kansas	3	.....	...	.....	....	72.1	1.1	74.9	8.3	73.2	5.8	73.4	5.1
Nebraska Territory	2	.....	....	.....	....	70.6	3.3	74.5	7.1	71.0	2.8	70.9	4.3
California	2	.....	....	69.3	0.0	66.5	0.2	68.1	0.1	72.4	1.3	69.1	0.

I. JULY, 1863—CURRENT WEATHER.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
				°		°	°	*In.*
.....	Washington	J. D. Parker	6	80	14	52	69.0	7.10
.....	Piscataquis	W. M. Pitman	7	88	14	51	67.3	6.24
.....	Kennebec	R. H. Gardiner	29	90	14, 15, 23	59	75.9	6.45
.....	York.....	G. W. Guptill	7	88	14, 23	58	70.3	7.10
HIRE.								
.....	Coos	Branch Brown.....	7	88	22	51	67.0	8.98
.....	Sullivan.....	Arthur Chase.....	1, 2, 7	88	21	58	71.0	6.56
IT.								
.....	Essex	H. A. Cutting	1, 2	92	22	53	70.3	8.60
.....	Orleans	James A. Paddock..	7	86	23	51	66.2	6.60
.....	Chittenden	Rev. McK. Petty....	7	82	18	55	68.3	5.76
.....	Rutland	David Buckland....	2	91	17, 18, 22	58	71.9	10.12
ETTS.								
.....	Essex	John H. Caldwell...	8	90	10	60	70.3	15.68
l.....	Bristol	Samuel Rodman....	26	83	10, 22	62	71.3	4.05
.....	Worcester.....	Jno. G. Metcalf.....	28	88	10	61	71.6	12.00
.....	Hampshire	Prof. E. S. Snell....	27	85½	23	55	70.9	8.64
... .	Hampden	Rev. E. Davis.....	27	85	22, 23, 24	58	71.7	10.31
a	Berkshire.....	Prof. A. Hopkins...	7	83½	22, 23	58	69.1	9.87
AND.								
.....	Providence.....	Prof. A. Caswell....	8, 26	85	1, 24	57	69.6	9.42
CUT.								
.....	Windham	Rev. D. Hunt	7	81	24	59	69.0	11.79
.....	Middlesex	Prof. John Johnston.	7	87	23	60½	71.8	11.14
RK.								
ling....	Dutchess.....	Wm. H. Denning...	27	89	18	60	70.6	9.11
.....	Putnam	Thomas B. Arden ..	3, 9, 26	80	17, 18, 21	61	75.0	6.81
nb Inst.	New York city ..	Prof. O. W. Morris..	16, 27, 28	87	14, 22	67	77.5	8.60
.....	St. Lawrence....	C. H. Russell.....	7	87	17	50	69.5	2.84
.....	Oneida.....	H. M. Paine, M. D...	3	93	16	58	74.6	5.46
.....	Madison.....	S. Spooner, M. D....	2	90	16, 17, 22, 23	60	71.6	8.88
.....	Jefferson	S. O. Gregory.....	7	87	17	50	71.5	1.28
.....	Oswego	Wm. S. Malcolm	1	82	17	56	69.1	4.35
.....	Monroe	Dr. M. M. Mathews .	2	89	16. 17	58	76.9	5.03
.....	Niagara	Dr. E. S. Holmes...	4	92	17	54	71.7	.....
.....	Erie.....	William Ives.....	2, 7	93	16	54	70.6	4.37

I. JULY, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.
NEW JERSEY.					
				°	
Newark	Essex	W. A. Whitehead			22, 23
Progress	Burlington	Thomas J. Beans	3	96	17
PENNSYLVANIA.					
Philadelphia	Philadelphia	J. A. Kirkpatrick, A.M.	15	87	17, 18
Susquehanna Depot	Susquehanna	H. H. Atwater	3	100	17, 22
Mount Joy	Lancaster	J. R. Hoffer	25	99	17
Harrisburg	Dauphin	John Heisely, M. D.	25	89	17
Tioga	Tioga	E. T. Bentley	11	96	22, 23
Fleming	Centre	Samuel Brugger	11	92	21, 22
Blairsville	Indiana	W. R. Boyes	8, 24, 27,	92	2, 12, 13
			31		to 16
Canonsburg	Washington	Rev. W. Smith, D.D.	5, 8, 23, 29	84	18
MARYLAND.					
Chestertown	Kent	Prof. J. R. Dutton	28	89	18, 22
St. Mary's	St. Mary's	Rev. J. Stephenson	11	86	17
Sykesville	Carroll	Miss H. M. Baer	25, 26	82	17
DIST. OF COLUMBIA.					
Washington	Washington	Smithsonian Inst'n	3	88	22
OHIO.					
Austinburg	Ashtabula	Dole & Griffing	1, 3	89	17, 18
New Lisbon	Columbiana	J. F. Benner	3	96	17
Welshfield	Geauga	B. F. Abell, A. M.	1, 3	90	16
Cleveland	Cuyahoga	G. A. Hyde	3	84	17
Kelley's Island	Erie	Geo. C. Huntington	3	88	16
Newark	Licking	Israel Dille	24	97	17
Westerville	Franklin	Prof. Jno. Haywood.	3	92	17
Portsmouth	Scioto	L. Englebrech	2	89	17
Toledo	Lucas	J. B. Trembly M. D.	2	93	18
Bowling Green	Wood	W. R. Peck, M. D.	1	88	16
Urbana University	Champaign	Prof. M. G. Williams	3, 24	92	16
Cincinnati	Hamilton	George W. Harper	2, 24	96	17
MICHIGAN.					
Monroe	Monroe	Flor. E. Whelpley	6	91	15, 16
Marquette	Marquette	Frank M. Bacon	7	83	15
INDIANA.					
New Castle	Henry	T. B. Redding, A. M.	3	95	16
New Albany	Floyd	Dr. E. S. Crozier	1, 3, 20	91	17
South Bend	St. Joseph	Reuben Burroughs	8	91	15

I. JULY, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
it'd.								
				°		°	°	In.
.....	Park.....	Miss M. A. Anderson	9	90	15, 16	57	73.4	4.13
.....	Posey.....	Jno. Chappellsmith..	3	91	16, 17	60	75.7	3.02
.....	Cook.....	Samuel Brookes	1	94	15	54	69.2	.....
.....	Peoria.....	Frederick Brendel..	4, 23	93	16	53	75.4	4.82
.....	Tazewell.....	J. H. Riblett.....	3, 9	94	14	51	72.4	3.30
.....	Morgan.....	Timothy Dudley....	9	96	16	50	73.8	7.30
.....	Knox.....	Prof. W. Livingston .	31	92	12	53	71.8	1.48
.....	Scott.....	Dr. & Miss E. Grant.	9	95	12	54	72.7	3.73
.....	Hancock.....	S. B. Mead, M. D....	8	93	16	53	72.9	2.62
.....	Milwaukie.....	I. A. Lapham, LL.D	.....	.....	.....	.....	.....	2.40
.....	.... do	Carl Winkler	31	90	15	51	67.7	.....
.....	Waupaca.....	W. Woods.....	7	96	15, 16, 17	49	69.4	.....
.....	Ramsey.....	Rev. A. B. Paterson.	6	91	14, 15	48	68.5	0.63
.....	Clinton.....	Dr. P. J. Farnsworth	8	98	15	55	72.2	5.55
.....	Dubuque.....	Dr. Asa Horr.....	8	92	12, 16	53	71.8	3.93
.....	Muscatine.....	Suel Foster.....	31	94	12	50	.....	.....
.....	Buchanan.....	A. C. Wheaton.....	4	101	15	48	73.3	6.40
.....	Lee	Daniel McCready ...	4, 5	95	13, 15, 16	53	74.3	1.71
.....	Jefferson.....	T. McConnel	5	104	15	56	77.1	0.50
.....	Kossuth.....	Dr. & Miss L. McCoy	8	96	15	51	72.1	1.50
.....	Lewis.....	George P. Ray	2, 31	102	15	55	75.8	0.77
.....	Cass.....	John Christian.....	10	100	16	58	78.0	.....
.....	Douglas.....	Arthur N. Fuller....	10	100	15, 16	60	76.5	0.11
.....	Riley.....	H. L. Dennison	2, 9	92	15, 16	58	76.1	4.54
.....	Washington.....	Miss A. M. J. Bowen.	9, 10	96	16	56	72.6	.....
.....	Sarpy.....	Rev. Wm. Hamilton.	30	86	13	54	71.0	2.25

II. JULY—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av five
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*De*
Maine	6	67.9	2.6	69.3	4.4	67.2	3.6	65.7	6.6	67.3	2.4	67.
New Hampshire	4	71.8	4.7	71.4	2.5	71.5	4.3	67.5	4.1	65.9	3.5	69.
Vermont	4	69.6	6.2	71.2	3.1	70.7	5.0	67.8	4.9	66.5	1.6	69.
Massachusetts	12	71.4	5.8	71.3	2.6	70.2	4.7	69.2	4.5	68.7	2.1	70.
Rhode Island	1	72.9	3.25	72.1	4.20	69.9	3.45	69.8	4.90	69.2	1.14	70.
Connecticut	4	71.8	5.8	72.7	2.7	69.7	6.8	69.5	3.5	68.1	2.0	70.
New York	18	72.1	4.8	73.3	2.9	72.0	4.1	71.9	4.6	69.2	3.3	71.
New Jersey	4	76.2	4.5	77.2	1.4	73.0	6.1	74.4	3.4	72.0	4.0	74.
Pennsylvania	20	76.4	5.8	76.7	2.1	70.2	3.6	76.1	3.1	73.4	2.8	74.
Delaware	1	.....	.....	.....	.....	75.6	3.95	80.4	1.27	.....	2.76	78.
Maryland	5	77.0	3.2	78.9	3.6	74.3	4.4	77.2	3.0	74.5	2.5	76.
District of Columbia	1	79.0	4.1	79.1	3.9	74.7	5.4	78.3	5.0	76.1	1.6	77.
South Carolina	6	81.2	4.23	81.6	3.42	77.4	7.90	80.1	6.63	78.8	6.23	79.
Tennessee	2	77.5	5.81	78.3	1.86	73.1	4.61	79.0	6.68	79.5	1.31	77.
Kentucky	4	78.1	3.0	79.1	2.1	75.6	4.7	78.5	5.0	78.2	2.3	77.
Ohio	12	74.7	5.8	76.0	2.7	71.5	4.9	75.9	5.0	74.4	1.6	75.
Michigan	8	76.1	8.8	72.3	2.3	71.6	2.9	72.9	.3	70.7	1.8	72.
Indiana	4	77.7	7.0	79.3	2.2	74.2	2.8	77.4	3.1	77.8	1.9	77.
Illinois	13	75.3	6.2	77.3	3.6	76.3	2.1	75.3	5.9	75.8	1.7	76.
Wisconsin	9	72.0	3.7	69.3	2.6	67.1	2.4	70.9	5.3	73.0	2.2	70.
Minnesota	3	70.2	.....	72.8	2.7	66.3	1.0	68.7	8.8	70.0	4.2	71.
Iowa	8	74.3	4.8	75.6	3.8	69.6	2.9	73.9	8.3	75.7	4.3	73.
Missouri	2	79.6	5.2	81.6	4.9	76.8	3.3	82.2	2.9	78.9	5.5	7.
Kansas	4	.....	.....	.....	.....	81.2	3.2	80.6	6.0	80.6	3.7	8.
Nebraska Territory	2	.....	.....	.....	.....	76.7	1.7	76.8	15.8	77.7	1.8	7.
California	2	.....	.....	73.5	0 1	60.7	0.0	69.4	0.0	66.9	1.3	6

I. AUGUST, 1863—CURRENT WEATHER.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
				°		°	°	*In.*
.....	Washington	J. D. Parker.....	10	85	31	48	65.0	2.30
.....	Aroostook	A. G. & Miss Young.	3	86	16	47	63.9	2.56
.....	Piscataquis	Mark Pitman.....	3, 11	83	30, 31	50	66.3	3.23
.....	York	G. W. Guptill	3	88	30, 31	52	68.8	4.39
RE.								
.....	Coos	Branch Brown.....	9	83	27	42	63.7	3.04
.....	Grafton	Robert C. Whiting..	5, 11	88	31	44	66.6	4.60
.....	....do	J. S. Ryan.....	10	82	28	56	.....	5.90
.....	Sullivan.....	Arthur Chase.....	3	92	31	45	69.0	5.78
.....	Essex	Hiram A. Cutting...	11	98	31	39	70.0	2.90
.....	Orleans	James A. Paddock..	9	81	31	44	62.9	1.66
.....	Windsor.....	Rev. J. H. Chickering	2, 10	92	31	46	70.0	5.92
.....	Chittenden	Rev. McK. Petty....	11	82	31	47	65.6	2.41
.....	Rutland	David Buckland....	2, 5, 6	88	31	48	69.7	7.28
TS.								
.....	Essex	John H. Caldwell...	3	92	31	53	70.3	4.97
.....	Bristol	Samuel Rodman....	3	90	31	56	72.5	2.42
.....	Worcester	Jno. George Metcalf.	3	90	30, 31	53	71.0	4.60
.....	....do	Rev. E. Dewhurst...	3, 10	86	31	49	65.9	5.00
.....	Hampshire	Prof. E. S. Snell....	3	90	31	49	70.1	6.11
.....	Berkshire	Prof. Albert Hopkins	11	86	31	45	69.1	5.24
ID.								
.....	Providence	Prof. A. Caswell....	9	89	18	51	70.3	4.59
T.								
.....	Windham	Rev. Daniel Hunt...	3	87	30, 31	52	69.6	6.24
.....	Middlesex	Prof. John Johnston.	3	94	27	50	70.9	4.90
.....	Washington	G. M. Ingalsbe.....	2, 3, 6	88	31	48	71.0	10.12
g....	Dutchess	W. H. Denning.....	3	92	27, 31	54	71.3	3.86
.....	St. Lawrence....	Cyrus H. Russell....	11	91	18, 30, 31	46	68.3	1.75
.....	Herkimer	James Lewis	11	88	31	46	70.9	.....
.....	Oneida	H. M. Paine, M. D..	11	96	31	47	70.5	5.84
.....	....do	Storrs Barrows	.....	.....	.....	.....	.....	5.25
.....	Madison	S. Spooner, M. D...	11	92	30	46	69.3	12.73
.....	Jefferson	S. O. Gregory	11	93	26, 30	48	66.0	2.41
.....	Oswego	Wm. S. Malcolm....	11	90	31	49	68.7	5.25
.....	Monroe.....	Dr. M. M. Mathews..	11	90	30, 31	46	69.1	3.70
.....	Niagara	E. S. Holmes, D.D.S.	11	93	30, 31	47	71.1	.....
.....	Erie.....	William Ives	11	91	31	44	69.8	2.96

I. AUGUST, 1863—CURRENT WEATHER—Continued.

Place	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
NEW JERSEY.				°		°
Newark	Essex	W. A. Whitehead	3	91	30	53
Janesburg	Middlesex	Rev. Wm. M. Wells	3	95	28	55
Progress	Burlington	Thomas J. Beans	3	101	31	56
PENNSYLVANIA.						
Philadelphia	Philadelphia	Pf. J. A. Kirkpatrick	3	94	30	60
Harrisburg	Dauphin	John Heisely, M. D.	10, 11	93	31	53
Tioga	Tioga	E. T. Bentley	10	96	31	40
Fleming	Center	Samuel Brugger	11	96	31	42
Canonsburg	Washington	Rev. W. Smith, D.D.	10, 11	91	30	41
MARYLAND.						
St. Mary's	St. Mary's	Rev. J. Stephenson	16	95	30	62
Sykesville	Carroll	Miss Harriet M. Baer	3, 10, 11, 14, 21	85	27	51
DIST. OF COLUMBIA.						
Washington	Washington	Smithsonian Inst'n	11	93	31	54
OHIO.						
Austinburg	Ashtabula	Dole and Griffing	2, 4	92	3, 31	41
New Lisbon	Columbiana	J. F. Benner	10	94	31	36
Welshfield	Geauga	B. F. Abell, A. M.	2, 20	90	30, 31	47
Cleveland	Cuyahoga	Mr. & Mrs. G. A. Hyde	5	92	31	40
Kelley's Island	Erie	Geo. Huntington	5	89	29, 30	52
Newark	Licking	Israel Dille	4	97	30, 31	41
Westerville	Franklin	Prof. John Haywood	2	91	30	43
Portsmouth	Scioto	L. Engelbrecht	11	90	30	47
Toledo	Lucas	J. B. Trembly, M. D	2	95	30	48
Bowling Green	Wood	W. R. Peck, M. D.	7	88	31	43
Urbana	Champaign	Prof. M. G. Williams	4, 15	93	30	41
Hillsborough	Highland	J. McD. Mathews	2	89	30	41
Cincinnati	Hamilton	G. W. Harper	24	94	30	45
College Hill	....do	I. H. Wilson	2	88	30	40
MICHIGAN.						
Monroe	Monroe	Florence E. Whelpley	9	95	29, 30, 31	50
Ypsilanti	Washtenaw	C. S. Woodard	2	88	29	47
INDIANA.						
New Castle	Henry	T. B. Redding, A. M.	14, 15, 21	93	30	36
New Albany	Floyd	Dr. E. S. Crozier	15	93	30	45
South Bend	St. Joseph	Reuben Burroughs	2	94	29, 30	40
Rockville	Park	Miss M. A. Anderson	16	89	29	44
New Harmony	Posey	Jno. Chappellsmith	3, 4, 9, 10, 17, 22, 23	90	30	47

*Average mean for 12 years, 74.8.

I. AUGUST, 1863—CURRENT WEATHER—Continued.

ce.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
				°		°	°	In.
.....	La Salle.....	Emily H. Merwin...	16	98	29	40	73.0	3.11
.....	Winnebago	J. W. Tolman	16	98	29	41	70.7	2.24
.....	Peoria	Frederick Brendel ..	17	93	29	46	75.2	2.24
.....	Morgan	Timothy Dudley....	16	95	29, 30	45	73.2	4.10
m.....	Madison	Mrs. A. C. Trible ...	16, 19	88	30	42	.....	1.59
.....	Knox	Prof. W. Livingston	16	93	29	46	73.0	1.30
'.....	Scott	Dr. J. and Miss E. Grant	16, 23	92	29	44	72.6	1.97
.....	Hancock	S. B. Mead, M. D.'..	1, 16, 23	91	29, 30	43	72.8	2.45
NSIN.								
.....	Milwaukie	I. A. Lapham, L.LD	1, 4, 8, 19	91	30	41	69.0	2.62
.....	Rock	Henry D. Porter....	16	93	29	42	69.5	3.56
SOTA.								
.....	Ramsey	Rev. A. B. Paterson.	18	91	29	39	67.0	3.19
'A.								
.....	Clinton.....	Dr. P. J. Farnsworth	16	95	30	40	73	
.....	Dubuque.....	Asa Horr, M. D.....	16	96	30	46		.87
.....	Muscatine	Suel Foster.....	17	96	29	4		3.40
ice.....	Buchanan	A. C. Wheaton.....	4	98	29			2.00
.....	Johnson	Prof. T. S. Parvin ..	16, 17	94	29			2.44
on.....	Lee	Daniel McCready...	19	96	29	41	74.5	5.57
lain.....	Jefferson	T. McConnel	4	104	29	40	75.5	5.51
... .	Kossuth	Dr. F. and Miss L. McCoy	7	95	30	43	69.7	10.06
URI.								
. .....	Lewis	George P. Ray.....	16	102	29	42	76.9	3.34
le.....	Cass	John Christian.....	22	100	24	54	78.4	.....
i.								
.....	Douglas	Arthur N. Fuller....	5, 23	99	29	45	74.7	2.25
.....	Riley	H. L. Dennison.....	20, 23	96	30	54	78.6	6.23
.....	Davis	Fred. P. Drew, M. D.	23	99	24	54	80.2	5.71
SKA.								
.....	Washington	John Evans.....	16	96	29	35	72.5	2.70

II. AUGUST—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. five y
		Mean temp.	Mean rain.	Mean. temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*
Maine	6	62.4	3.9	63.8	8.2	64.2	5.6	63.6	4.6	66.9	2.5	64.1
New Hampshire	4	64.9	2.5	65.9	....	66.6	5.9	65.1	4.1	58.7	3.4	64.3
Vermont	4	62.4	2.9	64.8	8.4	64.9	5.9	65.5	3.6	66.5	2.4	64.8
Massachusetts	12	66.1	3.2	65.5	11.1	67.4	5.1	66.0	5.1	66.8	4.6	66.4
Rhode Island	1	67.9	2.0	60.8	5.6	66.8	4.8	66.4	8.2	69.2	3.7	68.0
Connecticut	4	67.4	2.0	67.6	10.7	68.6	5.0	66.5	4.4	67.3	7.0	67.3
New York	16	67.9	2.4	66.1	4.8	61.0	4.7	69.4	3.5	68.8	3.8	66.1
New Jersey	4	70.7	2.9	70.3	4.8	72.3	6.6	70.4	3.7	70.0	4.6	70.1
Pennsylvania	20	71.4	3.8	69.6	4.1	69.6	4.8	71.5	3.4	71.2	4.1	70.0
Delaware	1	.....	....	.....	.....	74.8	6.43	77.3	4.30	.....	5.48	76.0
Maryland	4	72.6	5.7	70.1	5.1	72.5	5.9	73.2	2.6	73.2	2.7	72.4
District of Columbia	1	74.9	2.9	72.6	4.2	73.5	10.2	74.7	4.8	74.2	3.2	74.0
South Carolina	6	80.7	4.38	78.6	7.71	79.3	4.91	80.3	4.73	75.9	7.58	79.0
Tennessee	2	76.4	4.56	73.0	3.95	73.2	5.08	76.3	2.53	75.3	4.57	74.1
Kentucky	3	75.4	4.4	72.6	3.5	73.3	3.2	75.6	2.3	72.6	6.4	73.5
Ohio	18	72.2	4.1	68.3	1.9	69.9	3.6	71.5	4.4	71.3	3.9	70.8
Michigan	9	68.5	2.3	65.0	1.4	66.7	4.5	69.2	4.0	69.0	2.6	67.7
Indiana	4	74.0	4.4	71.3	2.9	72.9	4.3	73.7	4.0	73.6	4.3	73.1
Illinois	14	71.7	4.1	70.4	2.8	72.7	4.5	72.5	3.0	72.2	2.5	71.5
Wisconsin	9	67.7	1.8	66.9	1.9	67.4	3.6	68.9	3.6	69.5	1.8	68.1
Minnesota	3	63.4	10.5	63.4	2.7	67.8	3.9	68.6	3.9	66.2	4.1	65.5
Iowa	8	68.6	3.3	67.8	1.6	71.0	5.8	71.9	3.3	72.5	1.8	70.2
Missouri	2	74.4	6.5	74.0	4.4	73.4	3.5	73.7	2.9	76.1	2.9	75.1
Kansas	3	.....	....	.....	....	75.8	3.9	75.9	4.0	75.9	5.6	75.8
Nebraska Territory	3	.....	....	.....	....	.....	10.1	73.6	1.9	73.8	1.8	73.7
California	2	.....	0.0	69.6	0.0	61.7	0.0	69.2	0.1	71.3	0.0	68.0

I. SEPTEMBER, 1863—CURRENT WEATHER.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
				°		°	°	In.
.....	Washington	J. D. Parker	16	82	24	34	54.1	4.91
.....	Piscataquis	Mark Pitman	15	74	22	41	54.9	4.52
.....	....do	Edwin Pitman	16	87	23	31	53.6	.....
le....	Kennebec	B. F. Wilbur	.....	.....	.....	.....	.....	2.65
.....	York	G. W. Guptill	16	84	23	40	58.1	2.43
IRE.								
.....	Coos	Branch Brown	16	82	28	29	53.3	2.88
.....	Grafton	Robert C. Whiting..	16	88	23	31	56.4	1.80
.....	Orleans	James A. Paddock..	16	83	23	31	52.9	2.96
.....	Windsor.....	Rev. J. W. Chickering	18	88	23	32	59.0	2.06
.....	Chittenden	Rev. McK. Petty ...	16	78	23	25	54.8	5.30
.....	Rutland	David Buckland	16	84	23	34	58.4	3.34
.....	....do	Stephen O. Mead ...	16	86	23	32	56.2	.....
TTS.								
.....	Essex	John H. Caldwell..,	16	86	23	37		
.....	Bristol.....	Samuel Rodman	16	79	23	49		2.56
.....	Worcester	Jno. George Metcalf.	16	82	23, 24			.....
.....	Hampshire	Prof. E. S. Snell....	16	80	23		57.4	2.16
.....	Hampden	Rev. Emerson Davis	16	83	23		57.6	2.82
ID.								
.....	Providence	Prof. A. Caswell....	16	82	23	37	57.8	1.74
IT.								
.....	Windham	Rev. Daniel Hunt...	15, 16	77	23	37	56.7	2.90
.....	Middlesex	Prof. John Johnston.	16	84.5	23	34	59.6	1.73
.....	Jefferson	S. O. Gregory	16	84	27	30	53.2	2.20
.....	Onondaga	W. M. Beauchamp..	15, 16	89	22	37	57.0	.....
.....	Monroe.....	Dr. M. M. Mathews	16, 17	85	27	34	57.7	1.51
.....	Niagara	E. S. Holmes, D.D.S	17	85	23	31	59.7	2.80
Y.								
.....	Essex	W. A. Whitehead...	17	78	23	39	60.0	1.30
LA.								
.....	Northampton....	L. E. Ricksecker ...	3, 4, 6	82	23	41	63.4	.....
.....	Philadelphia.....	Pf. J. A. Kirkpatrick	7	81.5	27	44.5	65.6	0.98
.....	Dauphin	John Heisely, M. D..	8, 17	89	23	44	65.8	4

I. SEPTEMBER, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
PENN'A—Cont'd.				°		°
Fleming	Center	Samuel Brugger	16	86	28	34
Oil City	Venango	James A. Weeks	17	86	27	30
Canonsburg	Washington	Rev. W. Smith, D. D	17	85	27	30
MARYLAND.						
Sykesville	Carroll	Miss Harriott M. Baer	8, 12	79	23, 26	43
DIST. OF COLUMBIA.						
Washington	Washington	Smithsonian Inst'n	6, 9	80	28	43
OHIO.						
Austinburg	Ashtabula	Dole and Griffing	16	86. 5	27	32
New Lisbon	Columbiana	J. F. Benner	17	88	20	30
Steubenville	Jefferson	Roswell Marsh	.....	84	.....	37
Welshfield	Geauga	B. F. Abell, A. M	16	85	27	37
Cleveland	Cuyahoga	Mr. & Mrs. G. A. Hyde	16	86	27	41
Kelley's Island	Erie	Geo. Huntington	11, 16	85	26	42
Westerville	Franklin	Prof. Jno. Haywood	11	85	19, 25	37
Portsmouth	Sciota	L. Engelbrecht	17	84	27	39
Toledo	Lucas	J. B. Trembly, M. D.	16	88	26	32
Bowling Green	Wood	W. R. Peck, M. D	16	85	22	37
Urbana	Champaign	Prof. M. G. Williams	11	88	26	34
Hillsborough	Highland	J. McD. Mathews	8	82	26	36
Cincinnati	Hamilton	G. W. Harper	8	93	20	38
MICHIGAN.						
Monroe	Monroe	Flor. E. Whelpley	16, 29	80	22, 26	36
Ypsilanti	Washtenaw	C. S. Woodard	28	84	26	32
Lansing	Ingham	Prof. R. C. Kedzie	16, 28	83	26	27
Clifton	Kewenaw	Wm. Van Orden, jr	16	88	18	20
INDIANA.						
New Castle	Henry	T. B. Redding, A. M	8	90	20	33
New Albany	Floyd	Dr. E. S. Crozier	8	91	20	38
South Bend	St. Joseph	Reuben Burroughs	16	88	26	35
Rockville	Park	Miss M. A. Anderson	8	90	19	38
New Harmony	Posey	Jno. Chappellsmith	8	89	19, 20	45
ILLINOIS.						
Ottawa	La Salle	Emily H. Merwin	16	89	18, 19	40
Winnebago	Winnebago	J. W. Tolman	15	89	19	32
Du Quoin	Perry	Charles Ziegler	8	92	20	30
Peoria	Peoria	Frederick Brendel	16	88	19	38
Waverley	Morgan	Timothy Dudley	8	91	19	38

I. SEPTEMBER, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
Cont'd.				°		°	°	In.
.....	Madison	Mrs. A. C. Trible...	7, 8	84	20	40	64.5	.....
.....	Knox.....	Prof. W. Livingston.	27	86	19	38	61.3	3.70
.....	Scott.....	Dr. J. & Miss Grant.	8	90	18, 19	40	64.2	2.79
.....	Hancock	S. B. Mead, M. D ...	7	88	18	38	63.2	3.43
SIN.								
.....	Manitowoc	Jacob Lüps.....	23	78	19	32	55.2	.....
.....	Dane.....	Prof. J. W. Sterling.	15, 16	84	19	34	59.3	.....
.....	Rock.....	Henry D. Porter....	15	87	25	35	60.6	1.27
)TA.								
.....	Meeker.....	Henry L. Smith ...	28	94	18	38	59.1	1.87
A.								
.....	Clinton.....	Dr. J. P. Farnsworth	27, 28	88	19	34	62.3	2.35
.....	Dubuque	Asa Horr, M. D.....	16	89	19	39	63.3	2.16
.....	Muscatine	Suel Foster.....	1	84	25	36	.....	3.
ne.....	Buchanan	A. C. Wheaton	15	90	19	28	61.7	
.....	Johnson	Prof. T. S. Purvin ..	15	90	25	36		
n	Lee	Daniel McCready...	15	89	19	35		....
lin.....	Jefferson	T. McConnell.....	7, 8	98	25	39		7.10
.....	Kossuth	Dr. F. & Miss McCoy	14	95	19	34	4	1.19
TRL								
.....	Lewis	George P. Ray	7	97	19	38	66.9	2.86
e	Cass	John Christian.....	7, 14	98	20	46	71.1	.....
AS.								
.....	Douglas	Arthur N. Fuller ...	7	98	18	39	72.0	0.37
.....	Riley.....	H. L. Denison	7	95	18	39	73.2	0.73
SKA.								
.....	Sarpy	Rev. Wm. Hamilton.	14	93	18	37	65.6	1.75

		.36
		2.97
		3.87
	41.1	.....
	48.4	2.72
5	48.2	.....
25	48.0	4.09

II. SEPTEMBER—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years.		A
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*De*
Maine	6	56.4	1.8	58.8	3.5	57.8	1.6	58.8	3.5	55.9	4.0	57.6	2.9	55
New Hampshire	4	50.2	0.3	60.1	4.9	58.7	1.3	58.1	5.0	48.2	4.2	56.9	3.1	56
Vermont	4	58.1	4.5	58.3	4.0	57.8	1.8	59.0	3.8	56.0	4.2	57.8	3.7	56
Massachusetts	12	61.1	1.0	61.4	4.8	60.8	2.9	61.1	3.8	58.4	4.0	62.6	3.3	58
Rhode Island	1	61.9	0.3	62.2	5.1	60.3	2.3	62.2	3.1	59.6	3.7	61.5	2.9	57
Connecticut	4	62.4	0.5	63.4	4.1	61.5	3.0	61.4	4.9	59.1	4.0	61.6	3.3	58
New York	18	62.2	1.9	61.9	3.7	61.2	2.8	54.2	3.7	59.3	4.2	59.8	3.3	58
New Jersey	4	65.4	2.9	65.1	2.8	65.3	2.7	63.6	1.5	62.1	7.3	64.3	3.5	60
Pennsylvania	20	66.7	4.5	64.1	2.4	64.4	1.7	64.1	1.7	62.7	7.0	64.4	3.5	62
Delaware	1	66.5	....	.....	....	68.4	2.54	71.8	2.68	.....	4.79	68.9	3.34	...
Maryland	5	67.8	8.0	66.7	2.2	66.3	1.4	65.1	3.6	66.3	8 4	66.5	4.7	6
District of Columbia	1	70.1	2.9	67.4	1.9	.....	1.6	66.5	2.9	67.2	5.8	67.8	3.9	6
South Carolina	6	78.2	2.98	72.6	2.09	75.2	1.38	72.0	5.98	74.1	5.13	74.4	3.51	...
Tennessee	2	73.8	7.30	65.1	1.41	70.2	1.38	69.7	1.76	69.4	3.44	69.6	3.06	...
Kentucky	3	74.5	4.7	64.8	1.4	69.1	2.3	67.3	2.8	67.4	3.2	68.6	2.9	...
Ohio	19	69.7	5.4	63.3	2.4	65.4	1.4	65.0	1.6	62.9	3.4	65.3	2.9	6
Michigan	8	65.0	6.0	57.8	3.1	61.6	2.6	60.3	3.1	63.5	3.3	61.6	3.6	6
Indiana	5	71.5	5.7	63.1	0.7	67.7	1.6	66.2	2.9	65.2	5.4	66.7	3.3	6
Illinois	13	69.9	2.6	63.3	3.0	66.4	2.2	65.1	3.7	62.3	3.0	65.4	2.9	6
Wisconsin	9	63.0	4.5	58.4	3.5	61.8	3.8	60.6	4.1	58.0	3.0	60.4	3.8	5
Minnesota	3	60.4	....	49.9	....	60.0	3.0	57.8	3.6	55.4	3.6	56.7	3.4	5
Iowa	8	67.1	4.7	61.5	2.9	65.2	2.4	63.7	3.7	61.6	2.9	63.8	3.3	6
Missouri	2	73.1	3.9	65.6	2.9	70.0	2.1	71.3	3.9	66.4	4.4	69.3	3.4	6
Kansas	4	.....	....	.....	....	70.6	....	69.8	2.5	68.3	1.9	69.5	2.2	7
Nebraska Territory	2	.....	....	.....	....	75.3	2.5	64.9	2.6	63.0	2.1	67.7	2.4	6
California	2	.....	....	71.1	0.0	65.1	0.0	68.7	0.0	68.8	0.0	68.2	0.0	..

No.

IL.

Ottawa.....
Winnebago ....
Du Quoin.....
Peoria .....
Waverley .....

I. OCTOBER, 1863—CURRENT WEATHER.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
				°		°	°	*In.*
.....	Aroostook	A. G. & Miss Young.	1	72	29	13	47.3	2.37
.....	Piscataquis	Edwin Pitman.....	1	74	26	25	48.6	6.18
.....	....do.....	Mark Pitman.....	1	72	29	24	47.4	6.46
.....	Kennebec.....	B. F. Wilbur.....	.....	.....	.....	.....	.....	4.55
.....	York.....	G. W. Guptill.....	1	72	27	23	49.4	4.12
HIRE.								
.....	Coos	Branch Brown.....	1, 19	69	27, 29	16	41.3	3.98
.....	Grafton	Robt. C. Whiting...	19	72	29	18	47.5	2.43
n.....	....do.....	Rufus Smith.....	19	64	28	11	37.1	.....
.....	....do.....	Jabez S. Ryan.....	18	74	29	22	56.0	4.60
.....	Sullivan	Arthur Chase.....	19	72	29	21	49.0	3.95
r.								
.....	Orleans	James A. Paddock..	1	70	27	18	44.4	2.90
.....	Windsor	Rev. J. W. Chickering	19	74	29	18	50.0	4
.....	Windham	C. T. Alvord	.....	79	.....	41	55.9	5
.....	Chittenden	Rev. McK. Petty ...	18	68	27	21	46.7	3
.....	Rutland	Stephen O. Mead....	4	80	27	18	49.4	..
.....	....do.....	David Buckland	18	76	28	21		3
TTS.								
.....	Essex	John H. Caldwell...	1	72	29	30	52.3	3.07
.....	Bristol	Samuel Rodman	1	73	29	33	54.8	1.09
.....	Worcester.....	Jno. Geo. Metcalf...	18	72	27	28	53.1	3.10
.....	Hampden.....	Rev. Emerson Davis	.....	.....	.....	.....	48.9	5.26
ND.								
.....	Providence	Prof. A. Caswell.....	1, 15	72	27, 29	29	51.4	2.97
UT.								
.....	Windham	Rev. D. Hunt	1, 15	70	27	27	50.0	5.16
.....	Middlesex	Prof. Jno. Johnston.	18	75	29	23	51.0	3.34
K.								
l.....	Washington	G. M. Ingalsbee	2	79	29	21	53.6	2.60
ıg....	Dutchess	W. H. Denning.....	15	72	29	26	50.6	4.36
.....	Oneida	Dr. H. M. Paine	18	79	28	22	51.1	2.97
.....	Jefferson	S. O. Gregory	18	76	28	19	45.9	3.87
.....	Onondaga	W. M. Beauchamp..	1	74	28	21	46.1	.....
.....	Monroe	M. M. Mathews, M. D	18	76	29	26	48.4	2.72
.....	Niagara	E. S. Holmes, D.D.S	18	69	26, 29	26	48.2	.....
.....	Erie.....	William Ives	1	76	26	25	48.0	4.09

I. OCTOBER, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
NEW JERSEY.				°		°
Prairie Valley	Passaic	William Brooks	15, 18	72	29	24
Newark	Essex	W. A. Whitehead	1, 2, 3, 4	69	29	30
Somers' Point	Atlantic	Dr. & Mrs. Somers	4	70	27	31
PENNSYLVANIA.						
Nazareth	Northampton	L. E. Ricksecker	15	78	26, 28	31
Philadelphia	Philadelphia	A. Kirkpatri k. A M	18	76	26, 27	34
Harrisburg	Dauphin	John Heisely, M. D.	15	72	29	34
Tioga	Tioga	E. T. Bentley	16, 18	76	29	17
Fleming	Center	Samuel Brugger	18	76	26, 28	22
Oil City	Venango	James A. Weeks	1	76	26, 28	23
MARYLAND.						
Chestertown	Kent	Prof. J. R. Dutton	18	76	27, 28 29	35
St. Inigoes	St. Mary's	Rev. J. Stephenson	18	76	27, 28	40
Sykesville	Carroll	Miss Harriet M. Baer	18	73	29	24
DIST. OF COLUMBIA.						
Washington	Washington	Smithsonian Inst'n	21	72	28, 29	34
KENTUCKY.						
Louisville	Jefferson	(Louisville Journal)	16	75	25	27
OHIO.						
Austinburg	Ashtabula	Dole & Griffing	17	76	29	25
New Lisbon	Columbiana	J. F. Benner	1	78	12	26
Wellsfield	Geauga	B. F. Abell, A. M	1	76	28	27
Cleveland	Cuyahoga	Mr. & Mrs. G. A. Hyde	17	74	28, 29	34
Kelley's Island	Erie	Geo. O. Huntington	17	70	24, 28	39
Westerville	Franklin	Pf. H. A. Thompson	15	73	29	24
Kingston	Ross	Prof. Jno. Haywood	17	76	28	26
Portsmouth	Scioto	L. Engelbrecht. 4	15, 17	73	25, 28	32
Toledo	Lucas	J. B. Trembly, M. D.	17	76	26	31
Bowling Green	Wood	W. R. Peck. M. D	16	73	22, 28	30
Urbana	[illegible]sign	Prof. M. G. Williams	17	80	24, 28	27
Hillsborough	[illegible]nd	J. McD. Mathews	15, 17	71	24, 28	28
Cincinnati	[illegible]ton	G. W. Harper	17	75	25	31
[illegible]						
Monr[illegible]		Florence E. Whelpley	17	74	26	30
Ypsilanti		C. S. Woodard	17	72	26	22
Lansing		Prof. R. C. Kedzie	16	72	26	17
IN[illegible]						
Muncie		E. J. Rice	16	78	24, 28	27
New Castle		T. B. Redding, A. M.	17	78	24	29
S[illegible]land		William Dawson	16	77	24	28
[illegible]		Dr. E. S. Crozier	16	8	24, 28	32
[illegible]	[illegible]	[illegible]n Burroughs	[illegible]	5	24, 28	30

I. OCTOBER, 1863—CURRENT WEATHER—Continued.

ce.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
—Cont'd.				°		°	°	*In.*
.....	Park	Miss M. A. Anderson	16	75	24	27	47.6	5.00
ony.....	Posey	Jno. Chappellsmith .	16	73	25, 31	28	48.3	3.23
OIS.								
.....	La Salle.....	Emily H. Merwin...	16	75	31	24	43.7	4.23
Depot ..	Winnebago	J. W. Tolman	16	71	31	14	42.3	3.49
.....	Perry	Charles Ziegler	16	74	24, 31	18	46.3	3.60
.....	Peoria	Frederick Brendel..	16	74	31	21	46.6	3.92
.....	Morgan	Timothy Dudley....	15, 16	74	31	13	44.5	3.30
.....	Knox	Prof. W. Livingston.	16	68	24	24	43.7	4.74
.....	Scott.....	Dr. J. & Ellen Grant	16	73	24	19	46.5	3.93
.....	Hancock	S. B. Mead, M. D....	16	68	31	16	43.2	3.08
NSIN.								
.....	Milwaukie.....	I. A. Lapham, LL.D.	.....	.....	25	28	.....	2.97
.....	Dane.....	Prof. J. W. Sterling .	16	65	24, 25, 31	29	41.0	3
.....	Rock	Henry D. Porter....	16	69	31	18	45.0	2
OTA.								
.....	Ramsey	Rev. A. B. Paterson.	14	66	31	17	39.2	1.37
A.								
.....	Clinton	Dr. P. J. Farnsworth	2, 9, 16	70	24	26	45.0	6.25
.....	Muscatine	Suel Foster	15	70	31	14	41.7	4.20
ce.....	Buchanan	A. C. Wheaton.....	16	72	31	4	42.3	3.60
n.....	Lee	Daniel McCready ...	16	79	31	17	44.1	3.52
ain.....	Jefferson	T. McConnel	14, 15	66	31	15	42.4	3.50
.....	Kossuth	Dr. & Miss L. McCoy	15	72	31	14	40.4	0.79
JRI.								
.....	St. Charles	J. H. Plexander,....	.....	.....	24	11	.....	.....
.....	Lewis	George P. Ray	15	70	31	15	43.6	7.58
le.....	Cass	John Christian	2, 8, 16	78	31	26	51.6	2.88
AS.								
.....	Douglas	Arthur N. Fuller....	16	81	23	13	47.0	1.10
.....	Riley	H. L. Dennison	15	79	23	11	48.5	2.40
.....	Davis	Elford E. Lee.....	16	85	30	18	51.7	0.67
SKA.								
.....	Washington	John Evans	14, 15, 16	70	23	4	36.6	0.50
.....	Sarpy.....	Rev. Wm. Hamilton.	6, 11	70	31	14	42.5	1.00

II. OCTOBER—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years.	
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*
Maine	6	48.4	7.0	48.0	4.9	47.0	6.8	47.0	4.7	42.4	1.9	46.6	5.1
New Hampshire	4	50.2	9.2	47.4	2.8	47.1	6.6	45.3	6.3	41.0	1.9	46.2	5.3
Vermont	4	46.7	6.0	46.0	2.1	45.6	5.2	47.6	4.1	41.2	1.7	45.4	3.8
Massachusetts	12	47.4	9.3	50.6	2.4	49.6	4.1	53.2	3.1	46.4	2.2	49.2	4.4
Rhode Island	1	.....	....	.....	....	50.5	2.9	54.2	2.8	48.0	2.6	50.9	2.8
Connecticut	5	52.3	10.0	50.9	1.8	51.3	5.0	53.3	3.0	46.8	1.4	50.9	4.1
New York	18	49.2	5.0	49.1	1.8	48.4	4.9	52.8	3.1	46.1	1.6	49.1	3.7
New Jersey	3	51.8	4.6	52.8	1.4	55.2	3.5	55.2	1.6	47.5	2.7	52.5	2.8
Pennsylvania	20	50.6	3.6	51.3	1.7	52.1	3.0	55.9	2.3	48.7	1.8	51.7	2.3
Delaware	1	51.7	....	.....	....	56.3	3.79	62.2	2.55	.....	3.33	56.7	3.2
Maryland	5	52.0	3.8	53.8	3.1	54.2	2.4	56.8	3.0	50.4	2.4	53.4	2.9
District of Columbia	1	53.9	3.5	54.8	1.8	54.6	1.9	58.4	2.5	51.7	2.5	54.7	2.3
South Carolina	6	62.6	0.75	62.1	2.33	61.9	1.52	68.0	1.55	66.9	0.62	64.3	1.3
Tennessee	2	54.7	1.40	58.5	2.53	56.9	2.24	62.2	2.25	55.7	1.23	57.6	1.9
Kentucky	4	53.2	1.2	56.6	1.8	53.5	3.0	59.0	3.5	52.9	1.6	55.1	2.2
Ohio	20	50.4	2.8	53.1	1.7	49.7	4.5	55.5	3.5	46.3	2.2	51.0	2.9
Michigan	8	46.4	3.5	48.5	2.6	46.2	2.1	51.1	3.1	45.5	2.8	47.5	2.1
Indiana	5	50.9	1.3	55.4	1.5	51.4	2.6	55.9	3.6	51.3	2.6	53.0	2.3
Illinois	12	51.2	2.8	55.7	3.0	50.5	2.2	53.4	3.6	48.9	1.7	51.9	1.9
Wisconsin	10	45.9	2.4	49.3	2.5	46.7	3.1	48.9	3.2	44.7	2.0	47.1	2.4
Minnesota	6	.....	....	49.6	2.7	46.9	0.8	44.1	1.6	41.7	1.3	45.6	1.5
Iowa	8	47.7	3.1	53.2	6.6	49.2	2.2	51.2	4.6	48.4	0.8	50.0	3.3
Missouri	2	53.9	3.9	60.0	2.2	71.1	1.9	58.6	7.7	54.5	1.8	59.6	3.5
Kansas	4	.....	....	.....	....	54.3	....	56.9	6.6	54.3	0.5	55.2	3.5
Nebraska Territory	3	.....	....	.....	....	48.9	3.9	51.9	6.0	51.6	1.3	54.1	3.7
California	2	.....	....	58.2	0.2	61.5	0.4	60.5	2.6	65.4	0.2	61.4	0.8

I. NOVEMBER, 1863—CURRENT WEATHER.

ɔe.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
AINE.				°		°	°	*In.*
.....	Washington	J. D. Parker.....	17	56	30	9	39.5	5.90
burg.....	Piscataquis	Edwin Pitman.....	17, 19	52	30	10	36.6	5.20
aterville....	Kennebec	B. F. Wilbur	.....	.....	.....	.....	.....	3.95
.....	Androscoggin....	Asa P. Moore.....	3	60	30	17	42.7	8.09
ille	York.....	G. W. Guptill	20	58	30	16	38.9	8.60
AMPSHIRE.								
. .....	Coos	Branch Brown.....	18, 20	51	30	6	35.3	2.76
. .....	Grafton	Robert C. Whiting..	17	60	30	16	38.5	1.05
ttleton	....do	Rufus Smith.....	17	54	30	4	30.1	.....
ıf	Sullivan.....	Arthur Chase.....	3	59	30	18	39.6	3.55
MONT.								
rg	Essex	Hiram A. Cutting...	17	65	30	9	36.7	2.25
ry	Orleans	James A. Paddock ..	17	55	30	7	34.8	2
ld	Windsor	Rev. J. W. Chickering	5, 6, 18	60	30	16	41.0	3.7
on	Chittenden	Rev. McK. Petty....	5	53	30	12	37.5	2
. .....	Rutland	David Buckland	5	58	30	15	40.5	
.....	....do	Stephen O. Mead....	5	64	30	16	.....	...
CHUSETTS.								
h	Barnstable	N. Barrows, M. D...	3	62	30	19	45.1	6.79
l	Essex	John H. Caldwell...	20	65	30	21	4.41	5.14
lford	Bristol	Samuel Rodman	12, 17	61	30	21	46.3	6.76
.....	Worcester	John G. Metcalf	17	62	30	16	42.4	6.18
sville.....	....do	Rev. E. Dewhurst ..	17	60	.....	.....	.....	5.51
.....	Hampshire	Prof. E. S. Snell....	17	61	30	18	41.1	5.28
l	Hampden	Rev. E. Davis	20	67	30	18	40.9	5.43
ıtown	Berkshire	Prof. A. Hopkins ...	20	60	30	16	39.7	0.42
E ISLAND.								
ıce	Providence	Prof. A. Caswell....	20	63	30	21	43.5	7.51
ECTICUT.								
.....	Windham	Rev. Daniel Hunt...	17	63	30	17	41.9	5.57
wn	Middlesex	Prof. John Johnston.	20	66	30	20	43.3	5.02
ven	New Haven	D. C. Leavenworth..	5	62	30	25	44.0	.....
/ YORK.								
ı.....	Washington	P. A. McMore	4	72	10	10	41.3	2.83
artford	....do	G. M. Ingalsbee.....	5	62	30	18	41.4	2.08
Landing....	Dutchess	Wm. H. Denning...	2	63	30	25	42.2	4.61
rk.....	New York.....	Prof. O. W. Morris..	12	63	30	28	47.8	3
eur	St. Lawrence....	C. H. Russell	19	54	30	21	38.0	

I. NOVEMBER, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
				°		°
NEW YORK—Cont'd.						
Clinton	Oneida	Dr. H. M. Paine	5	68	30	14
South Trenton	...do	Storrs Barrows				
Theresa	Jefferson	S. O. Gregory	5	64	30	16
Oswego	Oswego	William S. Malcolm	14	59	30	20
Skaneateles	Onondaga	W. M. Beauchamp	5	61	30	14
Auburn	Cayuga	John B. Dill	5	70	30	22
Rochester	Monroe	Dr. M. M. Mathews	5	68	30	20
Wilson	Niagara	E. S. Holmes, D.D.S.	14	62	30	22
NEW JERSEY.						
Paterson	Passaic	William Brooks	5	65	30	23
Newark	Essex	W. A. Whitehead	5	65	30	25
Progress	Burlington	Thomas J. Beans	5	69	30	25
PENNSYLVANIA.						
Nazareth	Northampton	L. E. Rieksecker	3	70	30	23
Philadelphia	Philadelphia	Pf. J. A. Kirkpatrick	5	69	30	25
Harrisburg	Dauphin	John Heisely, M. D.	5	65	30	26
Fleming	Center	Samuel Brugger	5	72	23	22
Oil City	Venango	James A. Weeks	5	66	30	18
Cancasburg	Washington	Rev. W. Smith, D. D.	5	65	30	12
Pittsburg	Allegany	Prof. Dr. R. Mueller	5	81	30	15
MARYLAND.						
Chestertown	Kent	Prof. J. R. Dutton	5	68	30	25
St. Mary's City	St. Mary's	Rev. J. Stephenson	5	69	30	24
Sykesville	Carroll	Miss Harriet M. Baer	5	70	30	15
DIST. OF COLUMBIA.						
Washington	Washington	Smithsonian Inst'n	5	67	30	22
SOUTH CAROLINA.						
Beaufort	Beaufort	Dr. and Mrs. Marsh	3, 6, 7, 8	84	30	29
KENTUCKY.						
Louisville	Jefferson	Mrs. L. Young	2	75	30	10
OHIO.						
Austinburg	Ashtabula	Dole and Griffing	2	63	30	16
New Lisbon	Columbiana	J. F. Beuner	5	70	30	16
Wellsville	Geauga	B. F. Abell, A. M	2	61	30	12
Cleveland	Cuyahoga	Gustavus A. Hyde	2, 19	62	30	18
Kelley's Island	Erie	Geo. C. Huntington	4	59	30	19
Westerville	Franklin	Pf. H. A. Thompson	5	66	30	10

I. NOVEMBER, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
nued.				°		°	°	In.
.....	Ross	Prof. Jno. Haywood.	2, 5	70	30	14	43.3	3.28
.....	Sciota	L. Engelbrecht	5	67	30	20	46.3	1.83
.....	Lucas	J. B. Trembly, M. D.	2	65	30	17	44.2	3.83
a	Wood	W. R. Peck, M. D...	.....	61	30	19	43.0	3.48
.....	Champaign.....	Prof. M. G. Williams.	2, 5	70	30	9	42.7	3.48
.....	Highland.....	J. McD. Mathews...	5	69	30	12	42.7	2.83
.....	Hamilton.....	G. W. Harper.....	2, 5	75	30	12	43.5	2.05
.....	....do	John W. Hammitt ..	2	70	30	11	43.7	3.75
¶.								
.....	Monroe	Florence E. Whelpley	4, 19	60	30	20	42.0	2.67
.....	Washtenaw	C. S. Woodard	5	62	29	15	41.7	2.54
.....	Ingham	Prof. R. C. Kedzie..	5, 13, 19	[illegible]	29	12	39.8	0.41
.....	Keweenaw	Wm. Van Orden, jr..	16	[illegible]	28,29	8	29.8	1.95
.....	Delaware	E. J. Rice	2	68	30	7	40.6	
.....	Henry	T. B. Redding, A. M.	2	70	30	9	41.[illegible]	
.....	....do	William Dawson ...	2	70	30	7		
.....	Floyd	Dr. E. S. Crozier ...	2	80	30	15	[illegible]	2
.....	St. Joseph.....	Reuben Burroughs..	19	67	30	[illegible]	40.1	4.72
.....	Park	Miss M. A. Anderson.	13	66	30	5	33.5	5.13
.....	Posey	Jno. Chappellsmith..	2	72	29	12	44.7	2.48
.....	La Salle.....	Emily H. Merwin ...	4	65	29	0	37.0	1.85
.....	Winnebago	J. W. Tolman.....	11, 12	60	29	— 1	35.1	2.50
.....	Peoria	Frederick Brendel ..	13	67	29	4	40.9	0.71
.....	Tazewell	J. H. Riblett	13	65	29	1	39.9	0.94
.....	Morgan	Timothy Dudley....	4, 18	68	29	0	39.3	2.05
.....	Madison	Mrs. Anna C. Trible.	4	70	29	4	41.0	.....
.....	Knox	Prof. W. Livingston.	11	62	29	2	37.5	0.34
.....	Scott	Dr. J. & Ellen Grant	13, 18	68	29	0	38.9	1.[illegible]
.....	Hancock	S. B. Mead, M. D...	4	69	29	— 3	38.9	0.61
¶.								
.....	Manitowoc	Jacob Lüps.....	2	56	29	6	35.0	3.69
.....	Milwaukie.....	I. A. Lapham, LL.D.	5	59	29	5	.....	3.59
.....	Rock.....	Henry D. Porter....	2, 18	57	29	0	34.8	4.71
.....	Ashland	Edwin Ellis	.....	.....	29	— 6	.....	.....
¶.								
.....	Ramsey.....	Rev. A. B. Paterson.	12	55	28	—11	30.1	0
.....	Meeker.....	H. L. Smith.....	11	57	28	— 2	31.0	0

I. NOVEMBER, 1863—CURRENT WEATHER—Continued

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
				°		°
IOWA.						
Lyons	Clinton	P. J. Farnsworth, M. D.	11, 12	61	29	
Dubuque	Dubuque	Asa Horr, M. D.	18	67	29	—
Muscatine	Muscatine	Suel Foster	4	62	30	—
Independence	Buchanan	A. C. Wheaton	12	63	29	—
Iowa City	Johnson	Pr. T. S. Parvin, A.M.	12	61	28	
Fort Madison	Lee	Daniel McCready	4	67	29	—
Pleasant Plain	Jefferson	T. McConnell	13	66	29	—
Iowa Falls	Hardin	Nathan Townsend	18	53	28	—
Algona	Kossuth	Dr. F. & Miss L. McCoy	12	62	28	—
MISSOURI.						
Cameron	Lewis	George P. Ray	11	77	29	—
Harrisonville	Cass	John Christian	4	78	28, 29	
KANSAS.						
Manhattan	Riley	H. L. Denison	18	68	28	
Fort Riley	Davis	Elford E. Lee	18	74	29	—
NEBRASKA.						
Bellevue	Sarpy	Rev. Wm. Hamilton	6, 11, 12 17, 18	60	28	—
Fontenelle	Washington	John Evans	6, 11, 12 18	60	28	—

II. NOVEMBER—AVERAGES.

Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		Av. for five years.		Averages. 1863.	
		Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*
.....	6	37.1	4.95	35.1	3.10	37.1	3.29	30.7	2.07	35.5	4.68	35.1	3.62	39.4	6.35
shire	4	36.4	3.68	34.5	2.60	37.5	2.01	28.1	3.04	36.4	3.14	34.6	2.89	35.9	2.45
.....	5	34.6	1.28	33.2	2.28	35.7	2.24	30.2	2.88	35.8	3.17	33.9	2.37	38.1	2.51
tts	12	39.5	4.30	38.5	2.97	40.6	2.05	35.3	2.56	41.3	2.92	39.1	2.96	42.8	5.19
d	1	42.0	3.75	39.4	2.00	42.3	2.40	37.2	2.40	43.3	2.27	40.9	2.56	43.3	7.51
.....	5	42.6	3.34	40.7	3.49	40.7	3.01	35.5	3.17	41.7	2.61	40.3	3.12	43.1	5.30
.....	18	39.8	1.98	38.9	2.35	38.2	3.18	36.0	4.18	41.4	2.92	38.9	2.92	42.0	3.55
.....	4	44.7	2.66	42.3	4.01	42.3	1.39	38.7	4.34	45.3	3.74	42.7	3.22	44.1	2.68
ia	20	44.3	3.01	40.5	2.54	39.7	1.93	38.4	1.33	43.2	2.48	41.2	2.26	43.6	3.62
....	1	44.5	....	44.7	....	47.0	2.39	44.4	5.09	.....	3.47	42.7	3.65	.....	....
....	5	46.5	1.49	43.9	2.33	42.9	1.47	40.3	3.79	45.7	1.65	43.8	2.14	46.6	2.67
Columbia..	1	48.3	1.12	44.0	2.14	42.3	1.34	41.5	4.19	48.1	1.89	44.8	2.14	47.0	1.73
lina	6	59.9	1.44	57.2	3.28	64.8	2.49	49.3	2.84	59.6	2.63	58.2	2.54	.....	....
.....	2	52.9	4.66	44.3	6.04	45.6	5.71	41.6	2.87	51.7	4.71	47.2	4.80	.....	....
.....	4	51.4	3.62	43.5	4.06	42.2	2.78	39.9	2.57	48.8	3.01	45.1	3.21	45.7	3.14
....	21	45.4	5.23	40.1	3.02	36.1	5.70	36.9	3.85	44.0	4.52	40.5	4.46	42.4	3.21
.....	8	39.8	5.24	34.5	3.14	31.7	2.91	35.4	3.73	38.3	3.83	35.9	3.77	38.3	1.89
....	5	46.2	3.65	40.9	2.98	38.9	5.81	38.8	3.29	45.7	4.15	42.1	3.96	41.3	3.61
.....	14	41.8	2.81	35.0	3.62	33.0	2.67	34.8	3.76	40.8	2.90	37.1	3.16	38.7	1
.....	10	36.7	2.14	33.7	3.67	29.5	1.63	35.5	2.93	36.4	2.92	38.0	2	35.	
.....	3	33.1	1.37	25.3	1.40	25.2	2.58	26.8	1.26	30.0	2.03	28.1	1.73		
.....	8	36.1	3.09	33.5	3.51	30.7	3.53	31.3	3.74	38.7	1.98	34.0			9
.....	3	47.1	5.16	46.2	4.64	39.1	5.22	37.6	4.92	46.8	5.41	43		41.1	1.28
.....	3	.....	....	.....	....	35.5	3.61	34.3	2.19	45.0	0.74		8	40.6	1.86
'erritory...	3	.....	....	.....	....	32.1	1.75	31.0	0.59	37.2		0.4	1.19	39.3	2.00
.....	3	.....	0.00	52.2	0.65	54.8	2.31	55.5	0.40	53.1		54.9	2.48	.....	....

I. DECEMBER, 1863—CURRENT WEATHER.

Place.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.
				°		°
MAINE.						
North Perry	Washington	Wm. D. Dana	13	56	11	—4
Steuben	do	J. D. Parker	13	49	21	—2
Williamsburg	Piscataquis	Edwin Pitman	2, 14	42	11	—6
West Waterville	Kennebec	B. F. Wilbur	5	51	21	—2
Lisbon	Androscoggin	Asa P. Moore	4	48	22	—7
Carmichaelville	York	G. W. Guptill	5	47	22	—2
NEW HAMPSHIRE.						
Stratford	Coos	Branch Brown	14	46	11	—14
North Littleton	Grafton	Rufus Smith	14	39	11	—19
Littleton	do	Robt C. Whiting	14	46	11	—13
Plymouth	do	Jabez S. Ryan			22	—2
Claremont	Sullivan	Arthur Chase	4	48	10, 11	—2
VERMONT.						
Lunenburg	Essex	Hiram A. Cutting	14	48	11	—8
Craftsbury	Orleans	James A. Paddock	4	43	10	—8
Burlington	Chittenden	Rev. McK. Petty	4	45	10	—4
Rutland	Rutland	Stephen O. Mead	13	52	25	6
Brandon	do	David Buckland	13, 14	49	11	2
MASSACHUSETTS.						
Sandwich	Barnstable	N. Barrows, M. D.	18	56	10, 21	10
Tyngsfield	Essex	John G. Caldwell	13	51	21	6
New Bedford	Bristol	Samuel Rodman	14	55	11	10
Meadon	Worcester	John G. Metcalf	13	52	22	5
Baldwinsville	do	Rev. E. Dewhurst	14	47	23	—6
Amherst	Hampshire	Prof. E. S. Snell	14	52	23	3
Springfield	Hampden	J. Weatherhead	4	52	11	1
Westfield	do	Rev. Emerson Davis	4	50	23	4
Williamstown	Berkshire	Prof. A. Hopkins	13	49	11	1
RHODE ISLAND.						
Providence	Providence	Prof. A. Caswell	4	53	10, 22	8
CONNECTICUT.						
Pomfret	Windham	Rev. D. Hunt	13	52	11	3
New Haven	New Haven	D. C. Leavenworth	14	55	23	5
NEW YORK.						
South Hartford	Washington	G. M. Ingalsbee	13	47	10	—1
Fort Ann	do	P. A. McMore	5	55	25	0
Fishkill Landing	Dutchess	Wm. H. Denning	13	55	23	8
Throg's Neck	Westchester	Francis M. Rogers	13	54	23	10
White Plains	do	Oliver R. Willis	13, 14	54	23	8

I. DECEMBER, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
ont'd.								
				°		°	°	*In.*
Asy..	New York.....	Prof. O. W. Morris .	13	59	23	15	36.1	5.06
ratory	....do	Charles C. Wakeley.	14	56	23	13	33.9	4.41
.....	St. Lawrence....	C. H. Russell	14	52	10	—7	20.4	3.31
.....	Oneida	H. M. Paine, M. D ..	13, 14	51	22	—1	26.7	4.56
.....	....do	Storrs Barrows	.....	.....	25	—20	.....	2.25
or ...	Jefferson	Henry Metcalf.....	13, 14	51	10	2	26.2	4.50
.....	....do	S. O. Gregory	14	50	23, 25	—2	20.7	3.45
.....	Oswego	Wm. S. Malcolm....	4	49	10	6	27.2	5.55
.....	Onondaga	W. M. Beauchamp..	14	49	23	—1	26.2	.....
.....	Cayuga	John B. Dill.....	4 14	46	23	2	27.2	.....
.....	Seneca	Philo Cowing.....	14	52	23	6	28.9	.....
.....	Monroe.....	Prof. C. Dewey.....	4	53	25	7	28.7	1.98
.....	....do	M. M. Mathews, M. D	4	53	25	8	28.6	2.63
.....	....do	Andrew Mulligan...	4	55	25	9	30.2	1.78
.....	Erie.....	William Ives	4	49	24	5	30.0	2.45
.....	....do	Edward Dorr.....	4	50	24	6	30.1	1.16
.....	Niagara	L. Leffman.....	4	54	10	13	30.0	4.50
.....	Chautauqua	Dan'l J. Pratt, A. M.	13	59	24	7	31.5	3.13
.. ....	....do	Rev. S. W. Roe, M. D	8	74	24	1	33.6	6
EY.								
.....	Passaic	Wm. Brooks.....	13	55	23	2		
.....	Essex	W. A. Whitehead...	13	55	24	--		[illegible]
.....	Burlington	M. J. Rhees, M. D ..	13	60	21, 2[illegible]		[illegible]	.....
NIA.								
.....	Northampton	L. E. Ricksecker ...	13	[illegible]		10	33.1	.....
.....	Philadelphia.....	J. A. Kirkpatrick, A. M	14		23	16	34.9	4.89
.....	Lancaster	H. G. Bruckhart....	13	60	25	10	33.0	.....
.....	Columbia.....	John Eggert.....	15	73	26, 28	31	49.5	2.91
.....	Dauphin.....	John Heisely, M. D..	13	55	23, 25	19	33.4	6.81
.....	Tioga	E. T. Bentley	13, 14	58	23, 24	8	30.3	.....
.....	Center.....	Samuel Brugger....	4	56	24	6	.....	.....
.....	Venango.....	James A. Wachs....	4	51	24	4	31.7	.....
.....	Washington	Rev. W. Smith, D. D	12	56	24	9	32.3	1.49
.. ....	Alleghany	Prof. Dr. R. Mueller.	12	59	24	6	34.0	6.06
D.								
.....	St. Mary's	Rev. J. Stephenson..	12, 13, 14	58	25	20	38.6	3.50
.....	Carroll	Miss Harriet M. Baer.	13	60	25	8	38.0	5.30
MBIA.								
.....	Washington	Smithsonian Instit'n.	13	57	25, 26	18	35.4	3.71
LINA.								
.....	Beaufort.....	M. M. Marsh, M. D..	17	66	20	2[illegible]	48.0	.....
Y.								
.....	Jefferson	Mrs. L. Young	3, 4, 5	58	20	[illegible]	38.9	4
A								

I. DECEMBER, 1863—CURRENT WEATHER—Continued.

Place.	County.	Observer.	Date.	Maximum temperature.	Date	Minimum temperature.
OHIO.				°		°
Austinburg	Ashtabula	Dole & Griffing	4	55	24	—4
East Fairfield	Columbiana	S. B. McMillan	12, 13	53	24	8
New Lisbon	....do	J. F. Benner	12	68	24	10
Welshfield	Geauga	B. F. Abell, A. M.	4, 13	53	24	9
Rockport	Cayuhoga	Edward Colbrunn	4	55	19	19
Cleveland	....do	Mr. & Mrs. G. A. Hyde	13	57	24	13
Do	....do	Benj. A. Stanaul	4	58	24	9
Kelly's Island	Erie	Geo. C. Huntington	3	51	20	16
Westerville	Franklin	Pf. H. A. Thompson	12	56	24	4
Kingston	Ross	Prof. John Haywood	13	57	20	11
Portsmouth	Sciota	L. Engelbrecht	12, 13	59	20	18
Bowling Green	Wood	W. R. Peck, M. D	4	60	24	8
Urbana	Champaign	Pf. M. G. Williams	4, 13	55	20	3
Hillsborough	Highland	J. McD. Mathews	13	56	20	10
Eaton	Preble	Miss Olittippa Sarsh	13	56	20	3
Cincinnati	Hamilton	G. W. Harper	4, 13	58	20	10
College Hill	....do	John W. Hammitt	4	56	20	6
Do	....do	J. H. Wilson	4	56	20	6
MICHIGAN.						
Monroe City	Monroe	Flor. E. Whelpley	4	53	23	16
Do	....do	John Lane	3	55	24	9
Agricultural College	Ingham	Prof. R. C. Kedzie	4	49	6	10
Detroit	Wayne	C. P. Rabout	4	51	24	14
Tawas City	Iosco	Chas. H. Whittemore	4	43	24	5
Sugar Island	Chippewa	J. W. Church	1	40	20	—12
Ontonagon	Ontonagon	Henry Selby	1, 3	42	31	2
INDIANA.						
Muncie	Delaware	E. J. Rice	12, 13	56	20	—4
Spiceland	Henry	Wm. Dawson	4	55	20	1
New Castle	....do	T. B. Redding, A. M.	4	58	20	1
New Albany	Floyd	Dr. E. S. Crozier	5	61	19	14
South Bend	St. Joseph	Reuben Burroughs	3	60	20	—6
Rockville	Park	Miss M. A. Anderson	3	55	19	—2
New Harmony	Posey	Jno. Chappellsmith	4	59	31	5
ILLINOIS.						
Ottawa	La Salle	Emily H. Merwin	3	56	31	—12
Winnebago	Winnebago	Jas. W. Tolman	3	48	31	—10
Du Quoin	Perry	Charles Ziegler	4, 13	56	19	4
Tiskilwa	Bureau	Verry Aldrich	3, 8	54	31	—10
Peoria	Peoria	Frederick Brendel	3	59	19	—8
Pekin	Tazewell	J. H. Riblett	3	59	19, 31	—8
Waverley	Morgan	Timothy Dudley	3	58	31	—14
Upper Alton	Madison	Mrs. Anna C. Trible	4	57	31	—11
Galesburg	Knox	Prof. W. Livingston	3	57	31	—20
Augusta	Hancock	S. B. Mead, M. D	3	60	31	—18

I. DECEMBER, 1863—CURRENT WEATHER—Continued.

	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain.
I.				°		°	°	In.
.....	Manitowoc	Jacob Lüps.....	3	45	20	0	29.3	3.65
.....	Milwaukie.....	I. A. Lapham, LL. D	4	57	20	—2	29.2	6.25
.....	Waupaca.....	Wm. Woods	2	50	31	—5	25.3	2.85
.....	Dane	Prof. J. W. Sterling..	.....	.....	31	—15	.....	.....
.....	Rock.....	Henry D. Porter....	3, 8	45	31	—7	26.5	5.38
.....	Douglas	Eber H. Bly.....	1	43	15, 19	—15	20.0	1.37
A.								
.....	Ramsey	Rev. A. B. Paterson.	3	45	31	—28	20.6	1.31
.....	Clinton	P. J. Farnsworth, M.D	4	50	31	—10	28.4	7.35
.....	Dubuque.....	Asa Horr, M. D.....	3	46	19, 31	—13	24.9	6.58
.....	Muscatine	J. P. Walton	3	55	31	—18	27.0	7.72
.....	....do	Suel Foster.....	3	48	31	—22	23.6	7.80
.....	Buchanan	A. C. Wheaton	3	50	31	—30	23.7	5.27
.....	Johnson	T. S. Parvin, A. M..	3, 6	53	31	—23	27.0	2
.....	Lee	Daniel McCready ...	3	59	19, 31	—12	29.3	8
.....	Jefferson	T. McConnel	3	58	31	—30	27	
.....	Hardin	Nathan Townsend ..	4	42	31	—20		..
.....	Kossuth	Dr. and Miss McCoy.	2	46	31	-		a.84
L								
.....	St. Louis	A. Fendler	.....	....		—4	.....	.....
.....	....do	.....	4		31	—10	34.7	.....
.....	Lewis	George P. Ray.....	3		31	—17	28.7	5.34
.....	Cass.....	John Christian.....	1,6	54	31	—14	29.9	.....
.....	Douglas	W. L. G. Soule.....	3	60	31	—16	29.1	5.58
.....	Riley.....	H. L. Denison.....	6	57	31	—13	25.7	2.97
.....	Davis	Elford E. Lee.....	4	62	31	—12	28.6	3.42
TER.								
.....	Washington	John Evans.....	3, 22	41	31	—28	18.4	1.90
.....	Sarpy	Rev. Wm. Hamilton.	6	53	31	—20	25.4	3.85
TER.								
.....	Park	James Luttrell.....	8	57	16, 30	—10	20.6	4.31

II. DECEMBER—AVERAGES.

States and Territories.	Av. number of places.	Averages. 1855.		Averages. 1856.		Averages. 1857.		Averages. 1858.		Averages. 1859.		A fiv
		Mean temp.	Mean rain.	Mean. temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	Mean temp.	Mean rain.	
		Deg.	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	*Deg.*	*In.*	
Maine	6	23.7	4.50	20.5	3.80	26.5	4.55	19.8	3.10	16.5	5.87	
New Hampshire	4	26.8	5.40	17.7	3.09	28.7	4.39	17.7	2.85	17.7	4.49	
Vermont	4	24.6	2.50	16.9	2.31	27.1	3.35	19.4	2.40	16.3	2.92	
Massachusetts	12	30.3	5.81	24.6	4.21	33.0	5.18	29.1	3.84	25.1	4.97	
Rhode Island	1	32.2	6.10	25.5	5.80	34.6	5.20	32.1	3.45	28.4	3.45	
Connecticut	5	32.0	6.33	26.8	5.90	38.2	6.81	29.2	3.70	25.6	3.48	
New York	18	29.1	3.45	25.1	3.38	33.1	3.98	29.2	3.28	23.5	3.86	
New Jersey	4	34.3	5.10	30.9	3.56	35.9	5.42	34.0	4.20	30.8	4.33	
Pennsylvania	20	30.7	4.85	28.4	2.86	36.6	4.85	34.8	1.48	29.1	3.97	
Delaware	1	.....	....	34.5	....	43.7	4.70	43.0	6.39	.....	3.61	
Maryland	5	35.4	1.14	31.2	2.75	38.8	5.94	38.1	3.95	33.4	3.69	
District of Columbia	1	37.1	3.20	31.8	2.34	.....	5.54	39.9	5.79	34.6	6.22	
South Carolina	6	49.7	6.05	46.6	3.40	54.0	4.71	54.7	3.42	49.7	2.58	
Tennessee	2	38.1	2.27	34.2	5.07	46.6	5.28	46.1	8.47	35.2	9.91	
Kentucky	4	36.4	3.29	30.2	4.45	42.4	5.75	43.4	7.87	30.5	6.64	
Ohio	20	31.6	3.71	24.7	3.33	37.1	3.52	36.7	5.10	25.6	4.25	
Michigan	8	25.5	3.49	21.0	3.28	31.5	1.65	30.1	2.14	20.0	2.53	
Indiana	4	31.7	2.45	23.8	3.25	37.4	2.23	39.2	5.99	26.8	4.30	
Illinois	14	26.6	3.64	22.0	4.19	34.7	1.42	30.6	2.98	18.1	1.58	
Wisconsin	10	19.5	2.20	15.6	4.08	29.9	2.27	24.0	2.04	14.0	0.87	
Minnesota	4	9.9	1.25	4.9	....	23.4	1.44	14.7	1.34	5.9	0.64	
Iowa	7	20.2	2.09	15.2	4.50	31.4	1.27	23.9	1.90	15.2	0.58	
Missouri	3	32.1	3.10	29.8	4.29	40.0	2.58	38.3	8.52	24.5	2.45	
Kansas	3	.....	....	.....	....	37.8	0.22	29.9	1.18	21.9	0.18	
Nebraska Territory	3	.....	....	.....	....	32.1	0.80	20.1	0.89	15.0	0.46	
California	3	.....	0.00	43.9	2.40	49.6	2.48	45.6	5.47	45.8	2.85	

INDEX.

A.

	Page.
tion of plants	511
ge of each of the leading crops in the loyal States, and of the yield per acre of h crop	593–600
, Mrs. L. B.—Article on Farmers' Boys	307
[illegible] lily, blue	377
iculture, importance of	16
icultural statistics, value of	15
icultural exhibition at Hamburg, by Daniel Needham	19
American shed—articles contributed and States represented	25
Capabilities of Hamburg	21
Cattle pens	23
Commissioner, Hon. Jos. A. Wright	20
Description of buildings	22
Location and extent of exhibition grounds	21
Opening of the exhibition	26
Organization of committees	26
Ploughing match	27
Poultry shed and nations represented therein	22
Recapitulation	28
Sheep pens	23
States represented	21
Stalls for horses	24
Swine pens	24
icultural machinery, article on, by Hon. M. L. Dunlap	416
Baling and shipping hay	430
Broadcast seed-sowers and drills	428
Comparative cost of binding grain	431
Cost of ploughing by steam	421
Double shovel plough	425
Draining	434
Dunlap's weed-hook	419
Expense in the use of mowing machines	429
Expense of harvesting by hand	432
Farm mills	435
Gang ploughs	418
Harvesting grain	430
Hay rakes	429
Machines for preparing the soil	417
Machines for the meadow	428
Sorghum mills	435
The steel clipper plough	417
The double Michigan plough	419
The steam plough	420
The rotary spader	422
The roller and the harrow	425
Threshing and cleaning	432
Threshing of clover	433
Trial of steam ploughs	420
Trial of implements	423
Two-horse cultivator	424
icultural statistics, report on, by Lewis Bollman	579
Comments on Table No. 6	607, 608
General topics embraced in this report	580
Objects to be accomplished by the statistical division	579
Plans stated for a speedy annual collection of statistics of the crops	580
That of Great Britain	581
That of Prussia	584
That of United States	5

Pa

Agricultural statistics—
Remarks on Table No. 4 6
Table of crops and their prices for 1863, of loyal States, in tenths 3
Table of crops for 1863, yield per acre, number of acres in each crop, value per bushel, &c., and total value of all, for each loyal State 356-7
Tables of summary of each crop for each loyal State, showing the bushels, &c., number of acres, and value of each 364
Tables showing a general summary of the number of bushels, &c., of each crop, the number of acres in each, the value of each, the bushels, acres, and value of all; the comparison for the years 1862 and 1863, showing the actual per cent., increase and decrease in bushels, acres and value; their yield per acre, and their general average prices 62
Tables of farm stock for 1850 and for January, 1864, stated in tenths 1
Tables of farm stock for 1850, and for January, 1864, stated in numbers 1
Tables of imports and exports from New York from 1860 to July 1, 1864 1
Tables of exports of gold and silver from San Francisco, from 1860 to July 1, 1864 .....
Table of exports of leading agricultural products from New York, from January 1, 1860, to July 1, 1864 .....
Table of prices of the same in New York and England, from January 1, 1860, to July 1, 1864 .....
Table showing the prices of gold from January 2, 1862, to August 1, 1864 ..
Table of English imports of wheat, from 1854 to 1863 inclusive .....
Table showing the amounts and values of our exports of beef, pork, hams, and bacon, lard, butter, and cheese, for 1861, 1862, and 1863 .....
Table showing the receipts, exports, and prices of flour, wheat, corn, oats, beef, pork, lard, hogs, cotton, and whiskey, at New York, from May 1, 1858, to May 1, 1861 .....
Table of shipments of wheat, corn, oats, rye, barley, and total bushels of all, from Chicago, from 1858 to 1863 inclusive .....
Table showing the pork and cattle trade of Chicago, from 1858 to 1863 inclusive .....
Table of the prices of wheat, corn, oats, rye, barley, hogs, cattle, the hog and beef product at Chicago, from September, 1862, to July 1, 1864 6
Table showing the pork-packing of the West for the seasons of 1862–'63 and 1863–'64, showing the number packed, average weight per hog, yield of lard per hog, the decrease in number and weight, and the prices of hogs in Cincinnati, from 1854 to 1864 6
Alton, remarks on Ayrshire cattle .....
Alleghany mountains .....
Allen, W., cheese factory .....
Alpine Flora .....
Algo a goat, notice of .....
Apiary, Italianizing of .....
Aphis, or green louse .....
Apple, pear, and grape, article on, by F. R. Elliott .....
Apples, description of .....
Belmont .....
Dyer .....
Garden Royal .....
Jonathan .....
Swaar .....
Wagoner .....
Pears, description of .....
Beurre Giffard .....
Beurre Rose .....
Beurre Superfin .....
Conseiller de la Cour .....
Doyenne d'Ete .....
Duchesse d'Orleans .....
Madeleine .....
McLaughlin .....
Nouveau Poiteau .....
Stevens's Genesee .....
Wheildon .....
Grapes, description of .....
Adirondac .....
Catawba .....
Charlotte .....

Page.

ar, and grape, article on, &c.
es—
Clinton ... 128
Concord ... 128
Delaware ... 129
Isabella ... 129
Lydia ... 129
Maxatawny ... 129
Norton's Virginia ... 130
Rebecca ... 130
Rogers's Hybrid, No. 15 ... 130
Ir., remarks on breeds of cows ... 409
mules in United States in 1850 and 1860 ... 189
of in this country ... 183
re, evaporating powers of, in England and America ... 488
... 376
cattle, characteristics of, article on, by Sanford Howard ... 193
rshire cows, annual returns from ... 196
Dunlap stock," remarks on ... 194
portations, when made ... 194
porters of Ayrshires ... 197, 198
gin of Ayrshires, evidence of ... 195
ints indicating superior quality ... 195
perties important in dairy stock ... 196
eatment of calves in Scotland ... 197
... 373

B.

ices of at New York, and exports ... 613
ir location, &c ... 335
ices of at Chicago ... 617
r nature and habits ... 266
... 269
... 268
ncnoptera ... 275
m, description of ... 565
re, profits and importance of ... 544
and honey, production of ... 545
es of at New York and Chicago ... 613, 614, 617
gar, cultivation of ... 99
... 274, and 565, 566, 567, 568, 569, 575, 576, 577, 578, 579
portance of protecting ... 276
prey ... 278
s ... 284, 304
... 305
... 295
reedbird ... 303
Lewis, report on agricultural statistics ... 579
... 566, 575, 576
atent method of preserving milk ... 389
., article on wine ... 156
., experiments in India ... 514, 515
L. J.—Article on Culture and Management of Tobacco ... 87
icle on Hemp Culture ... 91
in and in ... 166
imon—Article on Farmers' Gardens ... 337
... 275
... 566
ird ... 299
evonshire, method of making ... 389
ces of at New York in 1863, and exports ... 613
... 278

C.

... 371, 372
iopian ... 370
yrshire, treatment of in Scotland ... 197
, meteorology of ... 626–676
ops in 1863 ... 593–599, 600
japonica ... 368, 3

Cape Aster
Carnations
Carrots, raising of
Cashmere and Thibetan goat, notice of
Catbird
Caterpillars
Cat family, *Felidæ*
Cattle, short horn
Ayrshire
Deficiency of in New England and Middle States
Distribution of in 1840, 1850, and 1860
Neat, in United States
Neat, table of
Cavalry horses in America, by Francis Morris
American horses in England
"Balrownie," importation, by Q. A. Shaw
Breeding thorough-breds, to be encouraged by government
Cavalry necessary in time of war
Darley Arabian
Dr. Harvey's explanation of circulation
English system of racing
Errors in breeding
"Goodwood cup" race
"Handicap" race
Horsemanship of the south
Horses of Texas
"Hunters," best of cavalry horses
Imagination, effects of, in reproduction
In-and-in breeding
Nicking explained
Pedigree of Slasher
Pedigree of Eclipse
Production of Racers in England
Superiority of constitution in thorough-breds
Thorough-bred trotting horses
Treatment of colts
Cedar bird, cherry bird
Cellars in dwelling-houses
Chenery, W. H., reports of success in raising goats
Cheese, exports of and prices of at New York
Cheese, manufacture of—
Article on, by S. J. Goodale
Analysis of milk, by European chemists
Analysis of whey
Apparatus used in cheese-making
Borden's method of preserving milk
Breeds for the dairy
Cheddar cheese, description of
Cheese vats of Ralph & Co., and O'Neil
Cheese presses
Devonshire method of making butter
Description and cost of factory
Goshen or English dairy cheese
Herkimer county, New York, cheese-making in
How proper temperature is to be obtained
Importance of the dairy as a branch of industry
Important points of cheese-making
Importance of even temperature in ripening
Manufacture of cheese by associated dairies
Management of cows
Markets for cheese
Process of manufacture at cheese factories
Practical operation of making cheese described
Relative value of different breeds of cows
Remarks on comparative returns of the dairy
Remarks of Robert McAdam on making cheese
Remarks of X. A. Willard on making cheese
Requisites in selection of a location for cheese factory
Sexual heat, effect on milk

Page.

, manufacture of—
Size and form of cheese most desirable 407
Statistics of profit and loss on good and poor cows 410
Temperature of milk when rennet is added 394
Value of whey 414
Pickadee 284
Pina grass 108
Pinese tea plant 517
Plover, threshing of 433
Poal in West Virginia 81
Poal oil in West Virginia 72
Poal oil in West Virginia, article on, by C. H. Shattuck 525
Borings, when commenced in 526
Cost and manner of shipping oil 529
Effect of the rebellion on the oil interest 528
Petroleum and its uses 526
Process of boring for 527
Pockroaches 275
Poir 108
Polts, importance of care of 172
Mule, how to be treated 186
Poleoptera 565
Polvin, Richard—Article on Italian Honey Bee 530
Pommissioner's report 3
Pommission on flax, hemp, &c 117
Ponestoga horse, article on, by Hon. John Strohm 175
"Conestoga" name, whence derived 175
Treatment of Conestoga colts 177
Characteristics of 178
Connecticut, meteorology of 623–676
Crops of in 1863, prices, acreage, and value 593–599, 600
Farm stock in 1864 606
Concord grape in the Mississippi valley and on the Hudson 484
Description 128
Copper in Minnesota 38
Corn, prices of at New York and Chicago, and exports 614–617
Cotswolds, description of 230
Cotton, prices of in New York, and exports 614
Cows, Ayrshire, annual returns from 196
Jersey, race of 411
Management of 412
Milch, tables of 252, 253, 254
Cranes 285
Cranberry culture, article on, by S. B. Phinney 131
Culture, when commenced in Massachusetts 131
Drainage and water, importance of 133
Experiments and failures in 131
Insects injurious to 134
Picking and packing of 135
Preparation of soil for 134
Profits of 135
Setting, time and manner of 134
Statistics of crop in Barnstable county, Mass 136
Creepers 296–300
Crickets 275
Cross breeding, eccentric results of 181
Crossbill, red 301
Croton Point vineyards 488
Crows 304
Cuckoos 280–292
Cultivator, two-horse 424
Curculionidæ 569
Currants, cultivation of 352

D.

Dairies, associated, &c 403
Dakota, meteorology of ..... 6[illegible] [illegible]
Deer ..... [illegible]
Delaware, meteorology of ..... [illegible]

Delaware—
Crops of, in 1863, prices, acreage and value 59
Farm stock in 1864 .....
Department of Agriculture, expenditures and labor of .....
Devon cattle .....
Diamant, M., process for making paper .....
Diehl, Israel S., article on the goat .....
Diseases of sheep .....
District of Columbia, meteorology of .....
Dodge, J. R.—Article on West Virginia .....
Article on flax .....
Article on short-horn cattle .....
Article on maize and maize paper .....
Dogs and Dog Laws—Article on, by J. R. Dodge .....
Concluding suggestions .....
Digest of our dog laws .....
Connecticut .....
Delaware .....
Indiana .....
Iowa .....
Maine .....
Maryland .....
Massachusetts .....
Michigan .....
Minnesota .....
Missouri .....
New Hampshire .....
New Jersey .....
New York .....
Ohio .....
Pennsylvania .....
Rhode Island .....
Tennessee .....
Vermont .....
Wisconsin .....
How dogs discourage sheep husbandry .....
What it costs to keep dogs .....
Why they should be taxed .....
Why they are not taxed .....
Dog family, (*Canidæ*) .....
Dove .....
Downs, south, &c., sheep .....
Drains, mole, &c .....
Drills, seed .....
Dunlap, Hon. M. L.—Article on Agricultural Machinery .....
Durham or short-horn cattle .....

E.

Eagles .....
Eclipse, pedigree of .....
Elliott, F. R.—Article on varieties of Apples, Pears and Grapes .....
Emery, H. D.—Article on Hogs and Pork-packing .....
Entomology .....
Entomology, classification of .....
Entomology, report on, by Townend Glover, Department of Agriculture .....
Beetles, asparagus .....
Bacon .....
Bark .....
Carrion .....
Cucumber striped .....
Elm tree .....
Flea .....
Grapevine, steel-blue .....
Indian Cetonia .....
Leaf-eating, or May .....
Long-horned .....
May, or leaf-eating .....
Pear-blight .....

	Page.
——	
..s, Predaceous ground	567
Rose	567
Spotted squash	579
Three-lined potato leaf	576
Turnip	578
Water	569
Borers, apple-tree	575
Cherry	566
Locust	575
Buprestis	566
Cetonia, Indian	568
Chilocorus bivulnerus	579
Classification of	563, 564
Coleoptera	565
Curculionidæ	569
Epicærus fallax	573
Ladybirds	579
Lamellicornia	566
Meal worm	569
Oak-pruner	576
Obera tripunctata	576
Pangus calignosus	565
Plum knot	572
Potato fly, *(Cantharis)*	569
Prickly Leptostylus	576
Spearman, *(ten-lined)*	578
Weevils, granary, rice, pea, and others	573, 574
Wire worm	576
tt, remarks on foreign ice trade	448
..ts of domestic produce, specie, and foreign merchandise from New York, and of gold and silver from San Francisco	609
Of leading articles of agricultural products at New York, from 1860 to July 1, 1864	610
Of beef, pork, hams, and bacon, lard, butter, and cheese from the United States for the years 1861, 1862, and 1863	
Of flour, wheat, corn, oats, beef, lard, and cotton from New York, from 1863, to May 1, 1864	

F.

ners, number in the United States	545
ners' boys, article on, by Mrs. L. B. Adams, Detroit, Mi	307
A word to the fathers of	312
Customary treatment of	309
Education, importance of	308
Wrongs done to	308, 309
rs' houses, article on, by Dr. W. W. Hall	313
An illustration of the laws of miasm	319
Barns, location of	335
Cellars in dwelling-houses	319
Chambers, importance of ventilation	323
Ice-houses, and importance of ice	333
Kitchen, arrangement of	329
Miasm, remarks upon	315
Piazzas, remarks upon	331
Privies and water-closets, loc of	329
Recapitulation	318
Shade trees	335
Smoky chimneys, prevention of	326
Stables, arrangement of	336
Ventilation, importance of	322
Water an essential consideration	321
Water pipes for convenience of water	328
Water conveniences, arrangement of	329
Where shall I build?	313
rs' gardens, article on, by Simon Brown	227
Currants, cultivation of	
Culture of vegetables in the garden	

Farmers' gardens, &c.—
Cherries in the garden
Currants in the garden
Grapes, cultivation of
Hot-beds for farmers' gardens
Location of the garden
Pears, cultivation of
Peaches, cultivation of
Plants injured by intermixture
Plums, cultivation of
Proper soil for the garden
Raising, gathering, and preserving seeds for the garden
Raspberries, cultivation of
Shade for gardens
Small fruits in the garden
Soil best for the production of good seed
Strawberries, cultivation of
Table of cost of vegetables for a family
Time to set seed-plants or sow seed
Time that seeds will retain their vitality
What part of the stem produces the best seed
When seeds should be gathered, and how preserved
Ferns
Field [illegible]
Fish [illegible]
Fish [illegible]
Finch [illegible]
Flax, [illegible] on, by J. R. Dodge
[illegible]
[illegible] supplies of
[illegible] of
[illegible] impoverish the soil
[illegible] varieties of
[illegible] for
[illegible]
[illegible] for
[illegible]
Soil [illegible] for
Sowing [illegible]
Weeds in
Flax and hemp commission
Flies, *Diptera*)
Flint, Wm.—Article on Grape Culture in the United States
Flour, [illegible] at New York, and export
Flowers, [illegible] on in the garden
How to preserve
Fruits, description of
Fly-catch[illegible]

G.

Gail's [illegible], Book of making grape and blackberry wine
Gardens, [illegible] of
Garden, Experimental, report of
Geraniums, [illegible] culture of
Glover, Townend.—Article on Entomology
Goats, [illegible] on, by Isaac S. Pehl
Asiatic goats, introduction into Europe
Goats' hair, Value and use of
Habits and characteristics of
Importation of goats into the United States
Remarks on different breeds
Report of the United States Agricultural Society on Cashmere goats
Report of American Institute
Report of commission at New York State fair
Scarcity of
Silesian goat and other varieties, value of
The Angora goat
The Cashmere and Thibetan goat
The wool-bearing goat

Page.

, Article on—
Value of, as compared with sheep or swine 218
Varieties, number of, &c 219
What improvements can be made in breed of goats 228
kers 294
.h, American 301
owned thrush 297
...es of, from January 2, 1862, to August 1, 1864 611
. S. L.—Article on Manufacture of Cheese 381
..... 269
..... 290
. description of 127
, cultivation of 354
Temperatures for growth and maturation of 479
Table of leafing, blooming, and ripening 490
Culture of, in Experimental Garden 548
culture in the United States, article on, by Wilson Flint 147
Grape harvest in California 155
Interchange of views, value of 147
Isothermal and meterological requirements of 149
Soil, preparation of, in Atlantic States and California 159
Vines, planting and preserving of 153
Vineyard sites, selection of, in Atlantic States and in California 159
Wine making in California 155
harvesting of 430
Threshing and cleaning 432
lawns, keeping of 554
...eak 301, 303
..... 305, 306

H.

, Dr. W. W.—Article on Farmers' Houses 337
, Ruth.—Article on House Plants 366
lett, F. F., his "Pedigree Wheat," how produced 503
, prices, at Chicago and New York 613, 617
Curing and smoking of ..... [illegible]
apshire downs, description of ..... [illegible]
aburg, position and description of 21
Exhibition at 19
..... 272
row and roller 425
vey, Dr., on circulation of blood in fœtus 169
rks 278, 290
, baling and shipping of 430
ip, imports of, &c 106
culture by L. J. Bradford 91
Breaking and dressing for market, how done 94
Crop, putting in of 92
Harvesting, manner of 94
Land, preparation of 92
Ripening, time of 92
Rotting, process of 94
Seed, culture of 92
...tes and climate adapted to growth of 91
...cattle 411
..... 306
Geo. H.—Article on Strawberry Culture 139
prices of, in Cincinnati from 1854 to 1864 621
and pork packing in the west by H. D. Emery .....
A model packing house .....
Berkshires .....
Breeds of hogs .....
Chester Whites .....
Cooked feed .....
Curing and smoking hams .....
Description of meats .....
Diseases of hogs .....
Distillery feeding .....

Page

Hogs and pork packing, &c.—Continued.
English meats 28
Field feeding 32
History of pork packing in Chicago 57
Hog raising 31
Hog tanning 55
Individual practice 23
Marketing hogs 24
Method of killing 31
Plan of hog house and yards 24
Points of a good hog 18
Pork packing at Terre Haute, Indiana 33
Price of corn and pork 26
Suffolks 21
Symptoms of disease 25
Table of prices of live and dressed hogs in Chicago during 1863 26
Table of current prices of provisions at Chicago during 1863 and 1864 28
The cutting up process 29
The curing room 29
Lard house 29
Offal, manner of disposal 29
Homestead law, benefits of, in Minnesota 4
Honey bee, importation of and general history 530, 531, 532, 533, 5
Horses, American, in England 1
Cavalry 1
Best breeds of 1
Conestoga 1
Horses and mules in army June 30, 1862 1
Hot beds for farmers' gardens 4
Houses, their location and construction 4
House plants, article on, by Ruth Hall, Chicago, Illinois 4
Aster, Cape 4
Auriculas 4
Azaleas, Chinese 4
Bouquets, winter 4
Cactus 4
Calla, Ethiopian 4
Camellia 365
Carnations 4
Cissus discolor 4
Cut flowers, arrangement of 4
Ferns 4
Geraniums 4
Hints on management of 4
Ice plant 4
Influence of cultivation of 36
Insects injurious to 4
Lily, Lirio African 4
Lily of the valley 4
Mignonette 4
Notylia albida 4
Passion flower 4
Preserving flowers, recipe for 4
Roses, monthly 36
Spirea, Japan 4
Temperature required for 4
Treatment of 4
Tuber rooted plants 4
Verbenas 4
Veronica 4
Violet 4
Watering 4
Wax plant, (*Hoya*) 4
Window culture of 4
Zebra plant, (*Maranta Zebrina*) 4
Howard, Sanford, on Ayrshire cattle 4
Humming bird 2
Hyacinths 4

I.

	Page.
) on, by L. Wetherell	439
tion of ice in Boston	447
of ice cut in 1864	443
)f ice from Boston from 1848 to 1863	449
ment of ice	439
er ton for shipment to foreign ports	448
s in 1847	442
)f cutting ice	442
vessels for ice	442
reight for shipping ice from 1851 to 1863	447
showing progress of the ice trade	441
building ice houses	447
	377
ortance of ice	333
f in 1863, prices, acreage, and value	593, 599, 600
ck in 1864	606
)gy of	625–676
ew York of dry goods, specie, and other merchandise, from 1860 to	608
&c.	111
of in 1863, prices, acreage, and value	594, 599, 600
ck in 1864	606
)gy of	625–676
	303
roved, description of	231
in 1863, prices, acreage, and value	594, 599, 600
ck in 1864	606
)gy of	626–676
description of	129
's Island, Waterloo, and Croton Point	491
ee, article on, by Richard Colvin	530
	537
n of	535
history of	531, 532, 533, [illegible]
ion of	530
ing queens	542, [illegible], 544
ing an apiary	538
nd importance of bee culture	544
queens	[illegible], 540, 541, 542
en	535
ies	535
ker	536

J.

	284
essor.—Remarks on Milk	387
	107

K.

of in 1863, prices, acreage, and value	594, 599, 600
ock in 1864	606
logy of	626–676
	64
neyards	488
cows	411
	294
	294
rm stock in 1864	606
logy of	624–676

L.

t, how pr	

Land birds
Important to agriculture
Lark
Lard, prices of at New York in 1863, and exports
Laws.—Digest of Dog Laws of different States
Leicester sheep, description of
Leptostylus, prickly
Leveoth, T. H.—Article on Root Crops
Lily of the valley
Linseed oil
Lippincott, J. S., Haddonfield, New Jersey.—Article on Geography of Plants
Lisle, Edward.—"Observations on Husbandry."
Locusts
Loomis, Silas L.—Article on Neat Cattle in United States
Longspur, Lapland
Low, Professor.—Remarks on the Ass and Mule

M.

Machinery, agricultural
Maine, crops of in 1863, prices, acreage, and value
Farm stock in 1864
Meteorology of
Maize paper and maize cloth, article on, by J. R. Dodge
Cost of manufacturing paper from corn husks
Manufacture of paper in Austria
Patents issued for making corn-husk paper
Mammalogy and Ornithology of New England, with reference to Agricultural Economy by D. A. Samuels
Birds
Clamatores, (screamers)
Gallatores, (waders)
Incessores, (perchers)
Oscines, (singers)
Raptores, (robbers)
Rasores, (scratchers)
Scansores
Insects
Coleoptera
Diptera
Hemiptera
Hymenoptera
Lepidoptera
Neuroptera
Orthoptera
Mammals:
Cheroptera, (bats)
Carnivora
Insectivora
Marsupiata
Rodentia
Ruminantia
Mangolds, growing of
Manilla, (hemp)
Maryland, crops of in 1863, prices, acreage, and value
Farm stock in 1864
Meteorology of
Martin, purple
Massachusetts, crops of in 1863, prices, acreage, and value
Farm stock in 1864
Meteorology of
McAdam, Robert.—Remarks on Cheese Making
Meadow lark
Meal worm
Merinos, American
Description of
French
Importation and description of

	Page.
nos, Spanish, importation of	231
Saxony	245
Silesian	245
anish	244
ogy of 1863	622
low to use the tables	622
Tables of current weather for—	
January	623
February	628
March	633
April	638
May	642
June	647
July	651
August	655
September	659
October	664
November	667
December	672
Tables of averages for—	
January	627
February	632
March	637
April	642
May	646
June	650
July	654
August	658
September	662
October	666
November	671
December	676
, remarks upon	315
ner, E. M. D., Avondale, Pennsylvania.—Article on Ornithology	287
higan, crops of, in 1863, acreage and value	595, 599, 600
Farm stock, in 1864	600
Meteorology of	625
e	270
Traps and poisons for	272
nonette	375
ch cows	261
k, analysis and preservation of	386, 387
ls.—Farm and Sorghum	435
nesota, crops of, in 1863, prices, acreage and value	595, 599, 600
Farm stock, in 1864	606, 676
Meteorology of	626
erals in Minnesota	38, 39
In West Virginia	78
nesota, article on, by O. H. Kelly	31
Bureau of immigration of	41
Cities and towns of	38
Climate of	33
Copper in	38
Drought in	37
Education in	35
Fruits of	32
Homestead law, benefits of	35
Irrigation, effects of	37
Iron and lead in	39
Manufacturing facilities of	39
Natural resources of wealth of	26
Population and character of	35
Productions of	32
Railroads of	39
Salt lakes in	41
Sioux depredations, account of	
Soil of	
Stock raising in	
Swamp lands in	
Timber of	

Minnesota, topographical features of
Wild game in
Wild rice in
Wool growing in
Missouri, crops of, in 1863, prices, acreage, and value....596, 59
Farm stock, in 1864
Meteorology of ... 63
Mocking-bird
Moles
Morris, Francis.—Article on Cavalry Horses
Moses, Z.—Article on Cultivation and Use of Teasel
Mules, raising of, article on, by J. T. Warder
Breaking of
Castration time of
Characteristics of the mule
Eccentricities of cross-breeding
First "Knight of Malta," when imported
Importance of selecting in procreation
Jacks and jennies in Mississippi valley
Mule, how produced
Practice of western mule raisers... 1
Remarks of Professor Low on the ass
Selection of mare for production of mules
Statistics of
Table of mules and asses in United States, 1850 and 1860
Table of mules and horses in army, June 30, 1862
Treatment of mule colts
Value of, on the farm and in the army
Muskrats

N.

Neat Cattle in the United States, article on, by Silas L. Loomis
Cattle in time of war
Cattle in the loyal States
Cattle in disloyal States
Deficiency of cattle in New England and Middle States
Distribution of neat cattle in 1840
Distribution of cattle in 1850
Distribution of cattle in 1860
Disturbing causes
Milch cows
Other cattle
Table of neat cattle in the United States, as per census of 1840–'50, and '60
Table showing relation of number of neat cattle to total population, as per census of 1840–'50, and '60
Table of milch cows, working oxen, and other cattle, as per census returns of 1840–'50, and '60
Table of milch cows, working oxen, and other cattle, and ratio of neat cattle to population, as per census of 1850
Table of milch cows, &c., as per census of 1860
Table of milch cows, &c., in 1840–'50, and '60
Table showing number of cattle for use and exportation for the years 1840–'50, and '60
Table showing cattle on hand and deficiency to each one hundred people in the several States in 1860
Table of working oxen, &c., in 1840–'50, and '60
Working oxen, milch cows, and other cattle
Working oxen
Nebraska Territory, farm stock in 1864
Meteorology of
Needham, Daniel.—Article on Agricultural Exhibition at Hamburg
New Oxfordshire sheep, description of
New York, crops of, in 1863, prices, acreage, and value....597,
Farm stock, in 1864
Meteorology of
New Hampshire, crops of, in 1863, prices, acreage, and value....596,
Farm stock, in 1864
Meteorology of

Page.
Jersey, crops of, in 1863, prices, acreage, and value 596, 599, 600
Farm stock in, 1864 606–676
Meteorology of 624
-hawk 294
ches 300

O.

pruner 576
, prices of, at New York and Chicago 614, 617
, crops of, in 1863, prices, acreage, and value 597, 599, 600
Farm stock, in 1864 606
Meteorology of 624–676
ard houses, purposes of 549
les 304
thology, Agricultural, by E. Michener, Avondale, Pennsylvania 287
Birds, land 290
Bittern 306
Blackbirds 304
Bluebird 295
Bluejay 305
Bobolink 303
Butcher bird 299
Catbird 299
Cedar bird, Cherry bird 299
Chimney swift 293
Creeper, American 300
Crow 304
Cuckoo 292
Eagle, golden 291
Eagle, whiteheaded 291
Finch 301
Flycatchers 294
Goatsuckers 294
Goldfinch, American 301
Grosbeak 301
Hawks ..... [illegible]
Herons 306
Humming-birds ..... [illegible]
Kingfisher 294
Larks 301–304
Martin, purple 298
Mocking-bird 299
Nighthawk 294
Orioles 304
Owls 291
Pigeon, wild 305
Plovers 306
Quail 306
Raven 304
Redbird, summer 298
Sandpipers ..... [illegible]
Shrikes ..... [illegible]
Snipes ..... [illegible]
Snowbird ..... [illegible]
Sparrows 301
Swallows ..... [illegible]
Swifts ..... [illegible]
Thrushes ..... [illegible]
Titlark ..... [illegible]
Titmice ..... [illegible]
Turkey, wild ..... [illegible]
Turtle dove ..... [illegible]
Vireos ..... [illegible]
Vultures ..... [illegible]
Warblers ..... [illegible]
Whip-poor-will ..... [illegible]
Woodcock ..... [illegible]
Woodpeckers ..... [illegible]
Wrens ..... [illegible]

Oil-cake
Oils, vegetable
Opossum
Owls
Oxen, working, tables of 252
Oxfordshire Downs, description of

P.

"Panhandle," in Western Virginia
Paper from maize
Passion flower, crimson
Paular, improved sheep, description of
Peaches, raising of
Pears, raising of
Description of
Pedigree, wheat, of Hallett
Pennsylvania, crops of, in 1863, prices, acreage and value 59
Farm stock in 1861
Meteorology of
Petroleum, when and where found
Pewee
Phinney, S. B.—Article on Cranberry Culture
Pigeons in grain fields
Pigeon, wild
Plants, geography of, by J. S. Lippincott, Haddonfield, New Jersey—
Acclimation of
Agencies of, distribution of
Alpine flora
American grape vine, temperature required by
Anna grape
Application of principles to practical vine-growing
Austrian wines
Bordeaux wines
Catawba grape
China, or black tea wheat
Cinchona, or quinine-producing trees
Climatological source of injury to wheat
Climate of United States, characteristics of
Clinton grape
Coffee in Southern India
Concord grape
Degeneration of wheats
Diana grape
European wine grapes, why they cannot succeed in the United States
Fenton wheat
Flora of the United States
French wines
Heat required by plants
Hunter's wheat
Hybrid Cerealia
Isabella grape
Italian wines
Kelley's Island grapes
Kœnigsberg wines
Mean temperatures, table of
Mediterranean wheat
Pedigree wheat, Hallett's
Piper's thick-set wheat
Range of certain annual plants
Rebecca grape
Red and white wheat
Rhine wines
Seed wheat, selection of
Spanish wines
Spring and winter wheat
Tables of temperatures for wine and for the grape
Tables of range of wheat 5
Tea-culture in Brazil, India, New Jersey, &c

	Page.
geography of, &c.	
Vine adapted to various districts	482, 486
Temperature affecting	478, 482
Temperature required by	489
On Kelley's Island	488, 491
Water, effect of, on plants	466
Wheat plant, its range, &c	499
Wheats, analyzed, different varieties of	499, 504
Periods of growth of	507
propagation of, by cuttings	559
hs, gang	418
Double shovel	425
Michigan double	419
Steam	420
el clipper	417
	306
raising of	352
tnot	572
ines	272
prices of, at New York in 1863, and exports	613
packing, history of, in Chicago	207
In Terre Haute, Indiana	209
House, a model	211
fly	569
of leading agricultural products in each of the loyal States	593–598
General average prices for all the loyal States of their leading agricultural products in 1862 and 1863	603
Of the same in New York, from 1860 to July, 1864	610
Of the same in England, July, 1864	610
Of beef, pork, hams and bacon, lard, butter and cheese in 1863, at New York	613
Of flour, wheat, corn, oats, beef, pork, lard, cotton and whiskey, at New York, for each month, from May 1, 1863, to May 1, 1864	614, 615
Of wheat, corn, oats, rye, barley, live and dressed hogs, live cattle, mess and prime pork, lard, hams, sides, shoulders, mess beef, beef ham and prime tallow, at Chicago, from Sept. 1862, to July 1, 1864	617
Of hogs in Cincinnati, from 1854 to 1864, inclusive	
Of gold, from January 2, 1862, to August 1, 1864	
Provisions, prices of, at Chicago, in 1863–'64	
Pruning, time and effects of	

Q.

Quails	306
Quails in cornfields	285

R.

bbits	272
cing, English system of	165
kes, hay	429
lall, Hon. Henry S.—Article on Sheep	229
dall, Hon. Alexander.—Letter on Dog	456
berries, cultivation of	354
	269, 270
Poisons for	272
Raven	304
Receipts and shipments of flour, wheat, corn, oats, beef, pork, lard, hogs, cotton, and whiskey, at New York, from May 1, 1863, to May 1, 1864	614, 615
Redbird	298
Red-poll	301
Redstart, American	298
Rennet, use of	388
Reproduction, effect of imagination	168
Report of Commissioner of Agriculture	3
Capabilities of the southern States	6
Commission on preparing flax and hemp	13
Entomology	13
Immigrants at port of New York	4
Importance of agriculture	
Labors and expenditures of department	

Report of Commissioner of Agriculture—Continued.
Productions of Virginia
Propagating garden
Reports on meteorology
Seeds, distribution of
Value of agricultural statistics
Report of Entomologist
Of Statistician
Of Superintendent of Experimental Garden
Rhode Island, crops of, in 1863, prices, acreage, and value 59
Farm stock in 1864
Meteorology of
Rice, wild, in Minnesota
Robin
Robins, anecdote of
Roller, iron
Roller and harrow
Root crops, article on, by T. H. Leverett
Carrots, raising of
Expense of growing
Harvesting time of
Mangolds, growing of
Harvesting, time of
Feeding, time of
Sugar beets, cultivation of
Turnips, cultivation and value of
Flat or English, cultivation of
Swedish or rutabaga, relative value of
When to be fed
Roses, monthly
Rutabaga or Swedish turnips
Rye, prices of, at Chicago

S.

Salt lakes in Minnesota
Samuels, E. A., Boston, Mass.—Article on Mammalogy and Ornithology
Sandpipers
Saunders, Wm., report of
Saxony sheep
Scott, Col. R. H.—Remarks on Goat-raising
Seeds, preservation of
Silesian sheep, description of
Shattuck, C. H.—Article on Coal-oil in West Virginia
Shaw, Q. A., importer of Balrownie
Sheep, article on, by Henry S. Randall, LL.D
Description of the Cotswold
French merino
Hampshire Down
Improved Infantado
Improved Paular
Leicester
Merino
Mutton breeds
New Oxfordshire
Oxfordshire Down
Saxony
Silesian
Shropshire Down
Diseases of
Abortion
Catarrh
Colic or stretches
Diarrhœa
Dysentery
Grub in the head
Hoof rot
Hoove
Locked jaw
Obstructions of the gullet

	Page.
ieases of—	
Ophthalmia	240
Parturient fever	244
Poisons	242
Rabies	241
Scab, &c.	244
Small-pox	245
Sore face and lips	240
l management of	237
Coupling, &c.	238
Dividing flocks for winter	238
Fall-feeding, breeding ewes	237
Weaning and fall-feeding lambs	237
ecting of, for a farm	239
ls and climate best adapted for raising sheep	229
ing management of	233
Burs	233
Chilled lambs	234
Constipation, diarrhœa	234
Cutting teeth	234
Disowning lambs, &c	235
Docking and castration	235
Lambing	233
Management of new-born lambs	234
Rheumatism	234
Swelled neck	234
Tagging	233
Treatment of ewes after lambing	235
Turning out to grass	233
amer management of	235
Attention to horns	237
Cutting hoofs	235
Doing up wool	236
Maggots	237
Registration	236
Salt	237
Storing wool	[illegible]
Storms after shearing	[illegible]
Ticks	[illegible]
Time and mode of washing	235
Time of shearing	236
Water and shade	237
ater management of	238
Amount of food consumed, &c.	239
Confining sheep to yards	239
Regularity of feeding	240
Water and salt	239
Winter shelter	238
uction of, by dogs	452
,oandry in West Virginia	61
of wheat, corn, oats, rye, and barley, from Chicago, from 1838 to 1863,	
nclusive	616
n cattle, article on, by J. R. Dodge	190
aracteristics of	191
portation to England of Thorndale stock	192
gin of	190
igree of Third Duchess of Thorndale	193
igree of Sixth Duke of Thorndale	193
rndale stock of America	192
	[illegible]
	[illegible]
Downs, description of	231
rds	269
	268
edigree of	174
	[illegible]
	[illegible]
nlina, meteor[illegible] of	[illegible]
tes, canal of	[illegible]
, d	[illegible]

	Page.
g in hogsheads, manner of	90
seed, time of	87
lanting, time of	88
d fall planting of	557
k, first trader in ice	439
	305
tion and value of	98

U.

gy of	631, 676

V.

ia	53
f the leading agricultural products of the loyal States	593–600
s of beef, pork, hams and bacon, lard, butter and cheese, from the for the years 1861, 1862, and 1863	613
ure of	346
of, in 1863, prices, acreage, and value	598, 599, 600
ck in 1864	606
ogy of	623, 676
s cultivation of	367
	372
, temperature required by	489
practical principles applied to	496
ithin the limit of	495
ar the northern border of	495
yond the limit of	494
of, for different localities	482
l against agitations of the air	482
determining the fitness of a district for their growth	493
shelter for	491
ture affecting	478
	378
ctions of	7
	299
	278, 290

W.

el, journal on bee culture	546
—Article on Mule-raising	180
	295
mule raiser	184
rritory, meteorology of	626
l resources of, in Minnesota	38
	268
Dunlap's"	419
	573, 574
	115
Chevalier, specimens of paper	437
petroleum in	525
article on, by J. R. Dodge	42
of	48
counties of	69
of	48
	81
on in	45
ion to free States	44
ands of	47
ments of	46
	80
ia valley	64
a of	42
s of	78
in region of	56
ndle"	58
l organization of	86
ion of	43
ls of	83

West Virginia, article on—Continued.
Iron, fall of
Statistics of production
Salubrity
Southern counties
Surface and soil of
Wetherell, L.—Article on Ice Trade
Wheat, winter and spring, distinction between
Different varieties of
Prices of, at New York and Chicago
Injury to, from climatological sources
Table of the periods of sowing and harvesting
Table of exports of, from 1851 to 1855
Time of ripening in different sections
To produce new varieties
Varieties of, resulting from different soils
Wheat culture, limits of
Whey, value of
Whippoorwill
Whiskey, prices of, at New York
Williamson, Colonel R. W., remarks on breeding goats
Williamson, L. S., remarks on his flock of goats
Williams, Jesse, originator of associated dairies
Willard, X. A., remarks on cheese-making
Remarks on Herkimer county cheese
Remarks on milk of cows in heat
Remarks on curing cheese
Wine grapes of Europe, why they cannot succeed in the Eastern United States
Chronicle for sixty-eight years
Temperatures required for the production of good, in Europe
Wine, article on, by F. Bossert
Blackberry wine, Gall's method
F. Bossert's method
Grape wine, Gall's method
Grape-vines in Germany, France, and United States
Red wine, manufacture of
Sugar-water, preparation of
White wine from Isabella grape
Wines of Austria, Berlin, France, Italy, Rhine, Spain, &c
Wire-worm
Wisconsin, crops of, in 1863—prices, acreage, and value
Farm stock in 1864
Meteorology of
Woodchucks
Woodcocks
Woodpeckers
Wool-growing in Minnesota
Wool-bearing goat, description of
Wool, doing up and storing of
Working oxen
Wrens
Wright, Hon. Joseph A., commissioner to Luxemburg

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